

JSC 07700
VOLUME V
REVISION A

SPACE SHUTTLE PROGRAM

(NASA-TM-X-70169) LEVEL 2 PROGRAM
DEFINITION AND REQUIREMENTS. VOLUME 5:
SPACE SHUTTLE PROGRAM INFORMATION
MANAGEMENT REQUIREMENTS, REVISION A (NASA)

N74-73982

00/99 Unclass
37251

INFORMATION MANAGEMENT REQUIREMENTS REVISION A

LEVEL II PROGRAM DEFINITION AND REQUIREMENTS VOLUME V



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

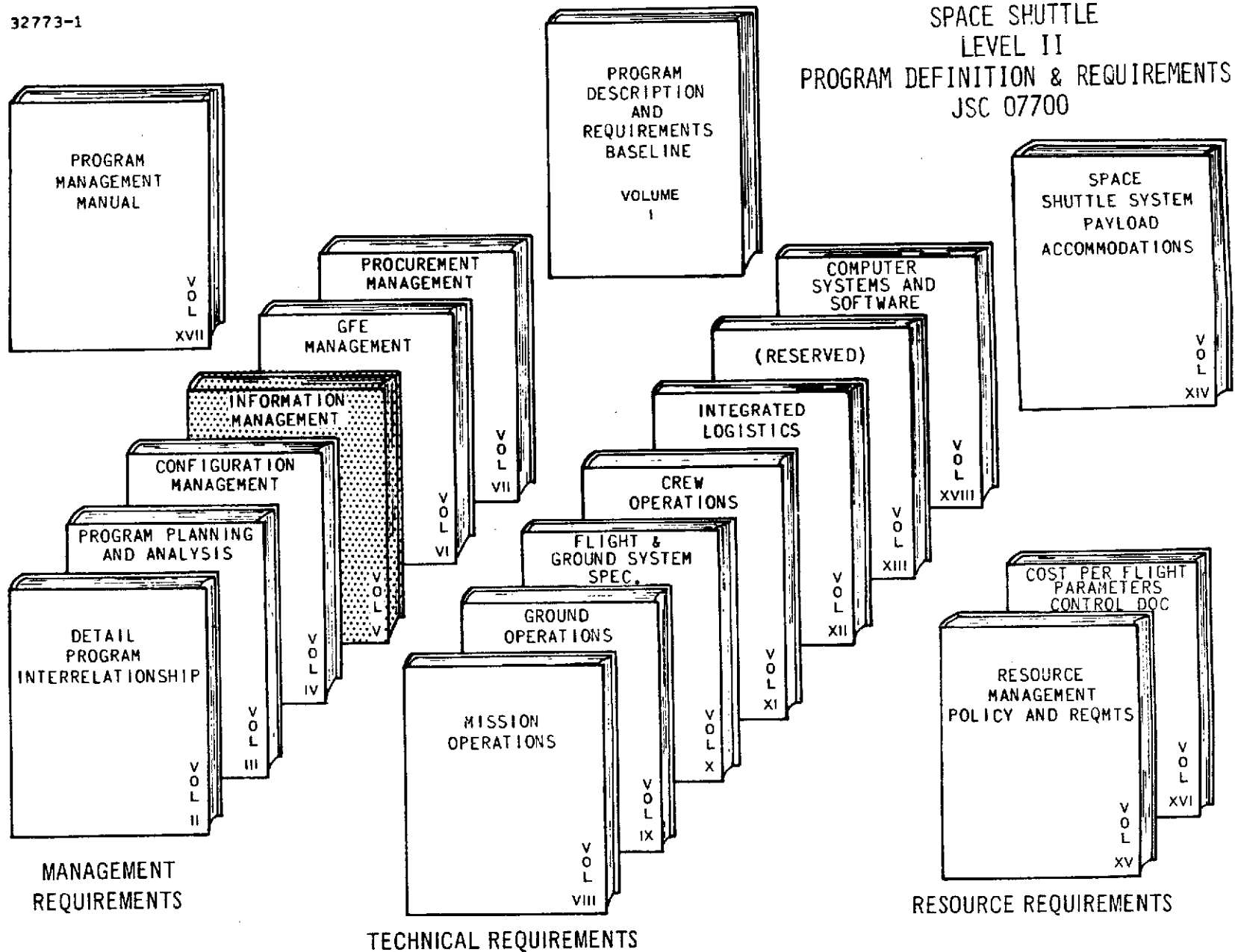
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SPACE SHUTTLE PROGRAM
INFORMATION MANAGEMENT REQUIREMENTS

Revision A
December 10, 1973

32773-1

SPACE SHUTTLE
LEVEL II
PROGRAM DEFINITION & REQUIREMENTS
JSC 07700



CHANGE SHEET

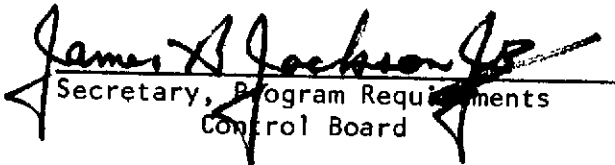
FOR

LEVEL II PROGRAM DEFINITION AND REQUIREMENTS
Volume V - Information Requirements

CHANGE NO. 1

Program Requirements Control Board Directive No. 00127,

December 10, 1973


Secretary, Program Requirements
Control Board

CHANGE INSTRUCTIONS

1. This is Revision A to JSC 07700, Volume V, dated December 10, 1973, which supersedes the original issue dated July 23, 1973. Please discard your Volume V dated July 23, 1973, and utilize this Revision A in its place.
2. This Revision A includes the contents of the original issue with the incorporation of SRR RID's as shown on the attached SRR RID Incorporation Reference List.
3. Subsequent changes to Volume V will be processed against this Revision A.

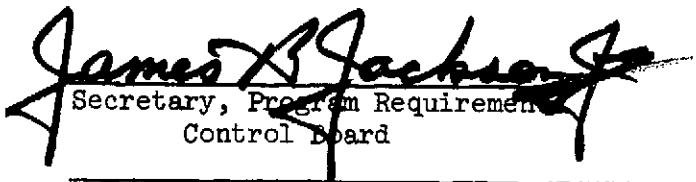
REVISIONS

REV LTR	CHANGE NO.	DESCRIPTION	DATE
A	1	BASLINE ISSUE (REFERENCE PRCB SS00043) / INCORPORATE SRR RIDS (REFERENCE DIRECTIVE 00127)	7-23-73 12-10-73

CHANGE SHEET
FOR
LEVEL II PROGRAM DEFINITION AND REQUIREMENTS
Volume V - Space Shuttle Program Information Management Requirements

CHANGE NO. 2

Program Requirements Control Board Directive Nos. 00127, 00215, and 00216
April 2, 1974


Secretary, Program Requirements
Control Board

CHANGE INSTRUCTIONS

1. Remove the following listed pages and replace with the same numbered attached pages:

<u>Page</u>	<u>PRCBD No.</u>
i	00215, 00216
7-7	
7-8	00127
7-11	
7-12	00216
7-37	
7-38	00127
7-38a (ADDED)	00127
7-38b (ADDED)	00127
7-49	00215, 00216
7-50	

NOTE: A black bar in the margin indicates the information that was changed.

2. Remove the List of Effective Pages, dated December 10, 1973 and replace with List of Effective Pages, dated April 2, 1974.
3. Sign and date this page in the space provided below to show that the changes have been incorporated and file immediately behind "List of Effective Pages".
4. Insert Revision Page immediately following cover sheet.

Signature of person incorporating changes

Date

LEVEL II PROGRAM DEFINITION AND REQUIREMENTS
Volume V - Space Shuttle Program Information Management Requirements

Baseline Issue (Reference PRCBD No. 00127, December 10, 1973)

LIST OF EFFECTIVE PAGES

April 2, 1974

The current status of all pages in this document is as shown below:

<u>Page No.</u>	<u>Change No.</u>	<u>PRCBD No.</u>	<u>Date</u>
i	2	00215, 00216	February 20, 1974
ii - ix	Revision A	00127	December 10, 1973
1-1 - 1-2	Revision A	00127	December 10, 1973
2-1 - 2-2	Revision A	00127	December 10, 1973
3-1 - 3-2	Revision A	00127	December 10, 1973
4-1 - 4-2	Revision A	00127	December 10, 1973
5-1 - 5-2	Revision A	00127	December 10, 1973
6-1 - 6-2	Revision A	00127	December 10, 1973
7-1 - 7-7	Revision A	00127	December 10, 1973
7-8	2	00127	December 10, 1973
7-9 - 7-11	Revision A	00127	December 10, 1973
7-12	2	00216	February 20, 1974
7-13 - 7-37	Revision A	00127	December 10, 1973
7-38 - 7-38a	2	00127	December 10, 1973
7-39 - 7-48	Revision A	00127	December 10, 1973
7-49	2	00215, 00216	February 20, 1973
7-50 - 7-74	Revision A	00127	December 10, 1973
8-1 - 8-16	Revision A	00127	December 10, 1973
9-1 - 9-16	Revision A	00127	December 10, 1973

E-3 a

SRR RID INCORPORATION REFERENCE LIST

JSC 07700 Vol. V

<u>Volume Location</u>	<u>RID NUMBER</u>
Paragraph 2.0	12-5-41
Paragraph 4.1	12-4-70
Paragraph 7.2.3	12-5-67
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1MA-8	12-5-78
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1MT-5	9-3-1
1SR-1	12-5-75
2CB-3	12-4-28
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2EN-14	2-L-3
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3MT-4	12-5-54
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3MT-6	12-5-54
3MT-7	12-5-54
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Table 7-XVII	5-H-1 & 5-H-5
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12-5-67 - OPR and source designation. Document changes are reflected in paragraph 7.2.3 and 7.2.6, Table 7-1 (redundant source column removed), Tables 7-II, 7-III, 7-IV (Source, OPR and reference columns updated and corrected), and Table 8-1 (redundant source column removed and quantities replaced with X symbol).

Appendix A was deleted as no longer required and as redundant to the Volume description in JSC 07700 Volume I.

LEVEL II PROGRAM DEFINITION AND REQUIREMENTS
Volume V - Space Shuttle Program Information Management Requirements

Revision A (Reference PRCBD No. 00127, December 10, 1973)

LIST OF EFFECTIVE PAGES

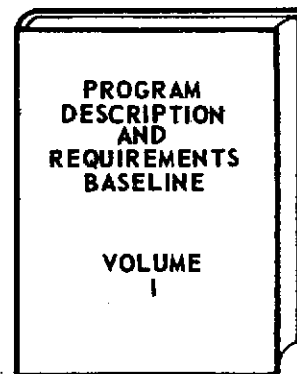
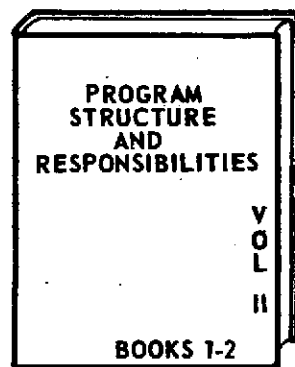
December 10, 1973

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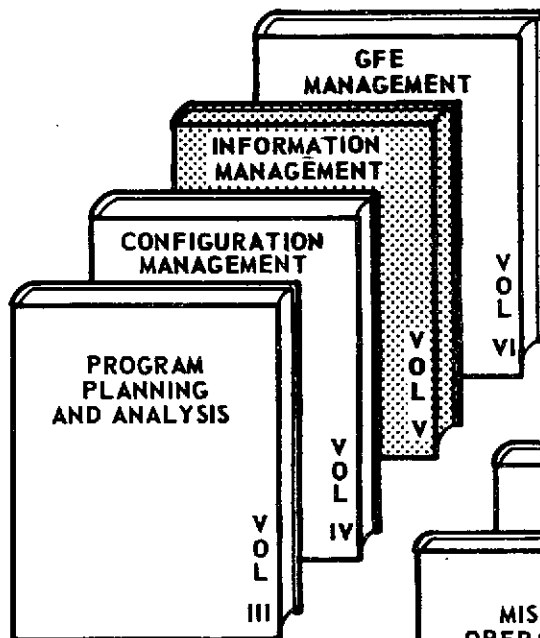
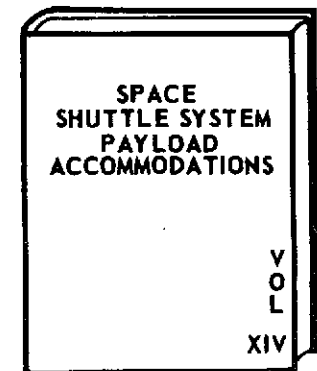
<u>Page No.</u>	<u>Change No.</u>	<u>PRCBD No.</u>	<u>Date</u>
i through ix	Revision A	00127	December 10
1-1 through 1-2	Revision A	00127	December 10
2-1 through 2-2	Revision A	00127	December 10
3-1 through 3-2	Revision A	00127	December 10
4-1 through 4-2	Revision A	00127	December 10
5-1 through 5-2	Revision A	00127	December 10
6-1 through 6-2	Revision A	00127	December 10
7-1 through 7-74	Revision A	00127	December 10
8-1 through 8-16	Revision A	00127	December 10
9-1 through 9-16	Revision A	00127	December 10

SPACE SHUTTLE PROGRAM
INFORMATION MANAGEMENT REQUIREMENTS

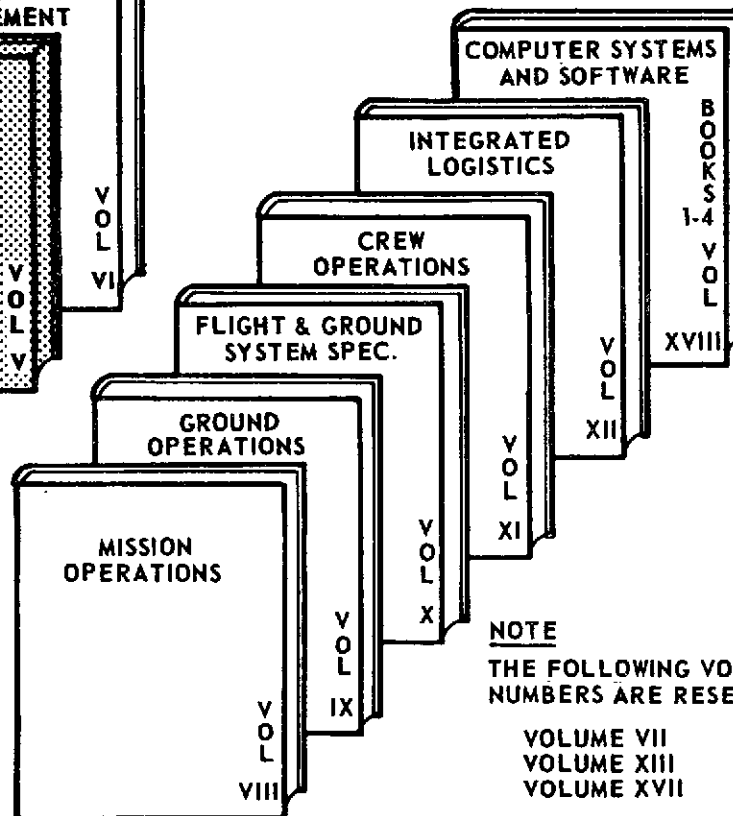
Revision A
December 10, 1973



SPACE SHUTTLE
LEVEL II
PROGRAM DEFINITION & REQUIREMENTS
JSC 07700



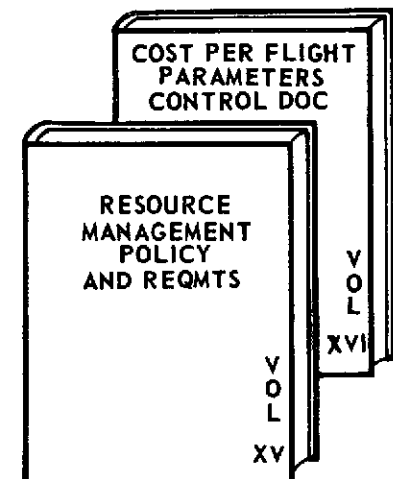
MANAGEMENT
REQUIREMENTS



TECHNICAL REQUIREMENTS

NOTE
THE FOLLOWING VOLUME
NUMBERS ARE RESERVED:

VOLUME VII
VOLUME XIII
VOLUME XVII



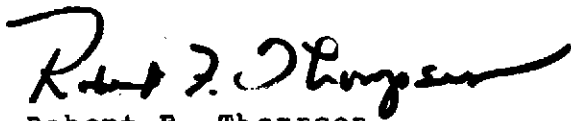
RESOURCE REQUIREMENTS

FOREWORD

Efficient management of the Space Shuttle Program dictates that effective controls of program activities be established. To provide a basis for program management; requirements, directives, procedures, interface agreements, and information regarding system capabilities will be documented, baselined, and subsequently controlled by the proper management level.

Program requirements that are to be controlled by the NASA Space Shuttle Program Director (Level I) have been identified and documented in Level I Program Requirements documentation. Program requirements, directives, procedures, etc., controlled by the NASA Space Shuttle Program Manager (Level II) are documented within the volumes of this document, JSC-07700. The accompanying figure identifies the volumes that make up the Level II Program Definition and Requirements baseline. Volume I contains overall descriptions of the contents of the volumes of JSC-07700 and references Level I Program Requirements documentation. Requirements that are to be controlled by the NASA Project Managers (Level III) are to be identified, documented, and controlled at the project level. All elements of the Space Shuttle Program must adhere to these baselined documents and, wherein it is considered that the requirements should be waived, deviated from, or changed; the proper waiver, deviation, or change request accompanied by a full justification must be submitted to the proper management level in accordance with established procedures. These documents are to be maintained current by change notices and revisions as required.

This volume of JSC-07700 (Volume V) defines the Space Shuttle information management requirements to be used by all NASA and contractor organizations involved in the Space Shuttle Program. All Space Shuttle information activities shall conform to the requirements contained herein.



Robert F. Thompson
Manager, Space Shuttle Program
December 10, 1973

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INTRODUCTION

This volume, the fifth in the series of 18 Level II Program Definition and Requirements documents, describes the Space Shuttle Program information management requirements and establishes the basic disciplines applicable to the information management system of each program element. The objective of this volume is to effect the degree of compatibility necessary for program element activities ultimately to achieve a single, totally integrated program information management system. In addition to system requirements, this volume also states the Level II requirements for information/documentation.

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SCOPE

The information requirements contained herein are the minimum program-level information system/product requirements and are applicable to each NASA element supporting the Space Shuttle Program and to each Space Shuttle project office. All information requirements stated in other Level II Baseline documents are reflected herein, as appropriate; however, in the event of conflicting statements regarding information requirements between this document and any other Level II document, the requirements of this document shall take precedence. Where appropriate, these requirements shall be implemented contractually by the project office to assure compatibility of the total program information management activities. The same system and information requirements that produce low-cost operations for the NASA and prime contractors shall also be extended to subcontractors, as appropriate.

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3.0

INFORMATION MANAGEMENT

A Space Shuttle Program information management activity shall be established that will control, monitor, and direct activities pertaining to information requirements, preparation, procurement, delivery, processing, storage, retrieval, updating, interchange, and distribution/communication.

3.1

DEFINITION AND APPLICABILITY

Information management, from the Program Manager's viewpoint, encompasses all information developed by all program participants in performance of their specific functions as necessary to assure the full accomplishment of the ultimate Space Shuttle Program objectives. The purpose of information management is to assure that all information developed is necessary, compatible with program requirements, available to users, and properly maintained and controlled. Information communication may be accomplished in the form of documents, microforms, punch cards, magnetic tapes, direct or remote computer access, and formal or informal contact between program participants. However, all media used fall within the scope of information management and must represent the most efficient and cost-effective means of communicating necessary and useful information.

The Space Shuttle information management system will encompass the requirements described herein. Each program element shall provide support to this activity in accordance with these requirements.

3.2

REQUIREMENTS AND CONTROL

Program-level information requirements shall be implemented by all program participants in producing information that must be compatible for consolidation and/or use at the program level. Consideration shall be given to developing information products in such a manner that operational as well as design requirements will be identified, developed, and ultimately provided

with minimum cost and schedule impact. Use of existing reports and formats is encouraged where practical and cost-effective. Continuous review of information activities will be performed to assure that requirements are current and valid, that the information being provided is necessary and useful, and that changes to established requirements receive adequate review and are fully justified and approved prior to implementation. Program Office representatives will participate in such reviews at each major project review (i.e., PDR, CDR, CI, etc.). Information-producing activities shall assure that the information products being provided fulfill their intended purpose and are provided in accordance with the established schedules.

3.3 ACQUISITION AND ACCESSIBILITY

Complete and accurate accounting of all significant information produced by all program participants shall be accomplished. This accounting shall be sufficient to enable rapid information retrieval for current requirements and for program-history reconstruction. Normal requirements for information distribution shall be the minimum amount to satisfy all primary users. Subsequent distribution shall be performed by request only on an accessioning basis. An accession list shall be provided and maintained that reflects all available Type 1, 2, and 3 information and that describes procedures for obtaining this listed information. Information-producing activities shall assure that all information having program significance is readily retrievable. This requirement includes studies and analyses that are the bases for program decisions. Information of this nature must be identified, retained, and made accessible to support the decisions and to facilitate future studies or analyses in the same or similar subject areas.

4.0

TYPES OF INFORMATION

For the purpose of establishing consistent information type descriptions for the Space Shuttle Program, the following information types and descriptions are applicable. They are presented for use by the project offices and other program participants in stating information requirements to contractors or other sources which are responsible for developing Space Shuttle information. It should be noted, however, that the information requirements stated in this Volume V do not necessarily dictate the document type (i.e. data requirement 2 CP-1, End Item Specification, listed in Table 7-III, is for SSPO information but will require project office approval.)

4.1

TYPE 1 INFORMATION

Type 1 information is that information that shall be presented for approval by the appropriate NASA office having final approval authority prior to implementation. Approved Type 1 information will be controlled and deviations from or changes to the concepts, techniques, and/or requirements stated therein will require approval prior to implementation.

4.2

TYPE 2 INFORMATION

Type 2 information is that information that is provided for coordination, surveillance, information, review, and/or management control. This information does not require formal review and approval.

4.3

TYPE 3 INFORMATION

Type 3 information is that information, the preparation of which is required by NASA or otherwise developed within the normal course of program effort, but which is not delivered or otherwise made available to NASA except upon specific request. (All contractor's and supplier-generated information used to fulfill program

requirements, whether specifically cited for
submittal or not, shall be made available upon
request).

INFORMATION IDENTIFICATION

All information shall be identified by a unique number that may be determined by the originating activity. All information developed for the Space Shuttle Program shall be clearly marked with the following information.

1. Source Identification number, including revision (if applicable)
2. Title
3. Date
4. Contract number (if applicable)
5. IRI number and IRD number (if applicable)
6. WES number
7. Type 1 information shall also be designated "Preliminary Approval Pending" or "Approved Reference (authority)" as appropriate. Additionally, all information that is reproduced in any quantity prior to receipt of appropriate approvals shall be clearly marked "Draft" or "Preliminary" on each page so that the information cannot be mistaken for official information.

NOTE: Additional special designations and deviations may be required on specific information products in accordance with configuration management requirements.

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DOCUMENTATION TREE

To standardize and coordinate information development for the Space Shuttle Program, the Program Office will adopt a documentation tree which will be included as Appendix E. The basic philosophy of this documentation tree is to be established and implemented by each project office through contract/working agreements. The Space Shuttle Level II Program Definition and Requirements (JSC-07700) has been prepared within the scope of higher level NASA Headquarters directives and is the Program Manager's baseline. These documents contain requirements for the technical, management, facilities, safety, quality, etc. aspects of the program as required to achieve the program objectives. All other program documents must be developed within the scope of the Level II program requirements. The documentation tree presents those documents recognized by the Program Office and authorized for development as required to fulfill the Space Shuttle Program objectives. Each project office shall develop a project level documentation tree which continues the basic philosophy of the program office documentation tree. These trees shall be used by program/project management to organize and control documentation production.

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7.0 LEVEL II INFORMATION REQUIREMENTS

7.1 REQUIREMENTS

The list of requirements for information products is contained in Table 7-I for easy reference. Detailed information concerning each of the three categories of information products submitted to the Space Shuttle Program Office (SSFC) - for approval, for information, and only upon request - is contained in Tables 7-II to 7-IV, respectively.

7.2 CONTENT

The content or format of tables 7-II to 7-IV is uniform and is explained as follows.

7.2.1 Number

This unique number is used to identify each information requirement. The number consists of an initial numerical prefix indicating the level II requirement (1, for Program Office approval; 2, for information; and 3, provided to Program Office only upon request), a two-letter component indicating the type of information grouping, and a suffixal hyphen and sequential number within each grouping.

The two-letter components used to indicate information groupings are as follows:

- CE - Configuration Baseline
- EN - Engineering
- LG - Operations/Logistics
- MA - Management
- MT - Manufacturing/Test
- PA - Problem/Action
- SR - Safety, Reliability, and Quality
- TR - Training

7.2.2 Title

The title is the descriptive name of the information requirements.

7.2.3 Source

The source is the office or agency responsible for information input or generation. Responsibility is indicated by a single letter except in those instances in which an integrated or system-level product is required; in those cases, an "X" is suffixed to the single-letter code. The code is as follows.

- S - Space Shuttle Program Office
- J - Johnson Space Center Element Project Office (EPO)
- M - Marshall Space Flight Center EPO
- K - Kennedy Space Center EPC
- R - System Contractor

7.2.4 Office of Primary Responsibility

The Office of Primary Responsibility (OPR) for information preparation is indicated by either an SSFC mail code (example - LV) or EPO. Where EPC is used, each element project office will assign an OPR in accordance with their internal management procedures.

7.2.5 Description/Comments

The description/comments column concisely describes the requirement, content, format, schedule, and other information applicable to each information requirement.

7.2.6 Reference

The reference column contains two types of cross-references. Tables 7-V to 7-XIX of this document contain detailed information regarding information requirements too lengthy to list in Tables 7-II to 7-IV. Reference is also made to other Level II baseline documents from which the information requirements are derived. These references provide amplifying information or elaboration upon the description/comments.

TABLE 7-I.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CONTINUED

(a) Documents submitted to SSEC for approval - continued

Number ----- Title -----

Configuration Baseline (CB)

1CE-1 (Reserved)
 1CB-2 (Reserved)
 1CB-3 Level II Change Request
 1CE-4 Interface Control Document (ICD)
 1CB-5 System Drawing Index
 1CE-6 Electromagnetic Compatibility
 Management Plan

Engineering (EN)

1EN-1 Master Measurements List

Operations/Logistics (LG)

1LG-1 Orbiter Integrated Ground
 Operations Plan (HPT)
 1LG-2 System Integrated Ground Operations Plan (VFT)
 1LG-3 (Reserved)
 1LG-4 Integrated Logistics Schedule

Management (MA)

1MA-1 Space Shuttle Level II Program Definition
 and Requirements (JSC-07700)
 1MA-2 (Reserved)
 1MA-3 (Reserved)
 1MA-4 (Reserved)
 1MA-5 Program Operating Plan (POP)
 1MA-6 Element Contract Data
 1MA-7 Operation Documentation
 Requirements
 1MA-8 Management Plan, Shuttle Materials Control
 and Verification Program

Manufacturing/Test (MT)

1MT-1 Master Verification Plan,
 Vols. I and II
 1MT-2 Vertical Flight Test Requirements
 Document
 1MT-3 (Reserved)

TABLE 7-1.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CCNTINUED_

(a) Documents submitted to SSPO for approval - concluded

<u>Number</u>	<u>Title</u>
1MT-4	Horizontal Flight Test Regmts Document
1MT-5	Preflight Checkout Requirements Document - VFT

Safety, Reliability, and Quality (SR)

1SR-1	EEF Part Qualification Test Requests
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Training (TR)

1TR-1	System Training Plan
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TABLE 7-I.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CONTINUED

(b) Documents submitted to SSPC for information - continued

<u>Number</u>	<u>Title</u>
Configuration Baseline (CB)	
2CB-1	End Item Specification
2CB-2	Drawings and Associated Lists
2CB-3	Space Shuttle Program Baseline Activity Index and Status Report
2CB-4	Space Shuttle Integrated Program ICD Status List
2CB-5	(Reserved)
2CB-6	Station Set Specification (Development and Test Sites)
2CB-7	KSC Station Set Requirements
Engineering (EN)	
2EN-1	Mass Properties Reporting
2EN-2	(Reserved)
2EN-3	(Reserved)
2EN-4	System Wind Tunnel Test Status Report
2EN-5	Drawing Release Status Report
2EN-6	Requirements/Definition Documents
2EN-7	Space Shuttle Definition Handbook
2EN-8	(Reserved)
2EN-9	Integrated Schematics
2EN-10	Software Development Plan
2EN-11	Control Materials List of Material Permitted in and Around the Vehicle during Ground Operations
2EN-12	Materials Properties Deviation/Waiver Request
2EN-13	Worksheets, Standard for Accountability, Control, Tracking Information, and Data on Materials
2EN-14	Simulation Plan
Operations/Logistics (LG)	
2LG-1	Space Shuttle Operational Data Books
2LG-2	System Turnaround Processing Flows
2LG-3	Maintainability Status Report
2LG-4	Logistics Support Plan

Management (MA)

TABLE 7-1.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CONTINUED

(b) Documents submitted to SSPO for information - continued

<u>Number</u>	<u>Title</u>	<u>Reference</u>
2MA-1	NASA Design Activity/Contractor Management Plan	
2MA-2	Expanded Work Breakdown Structure (WBS)	
2MA-3	Project Schedule	
2MA-4	Management Information Center (MIC) Audiovisual Materials	
2MA-5	Schedule, Technical, and Resources Report	
2MA-6	System Status Report	
2MA-7	Project Budget Report	
2MA-8	NASA Form 533M Report	
2MA-9	NASA Form 533F Report	
2MA-10	NASA Form 533Q Report	
2MA-11	Cost per Flight Report	
2MA-12	Information Requirements Document	
2MA-13	Information Accession List	
2MA-14	Review Data (Handouts) From Significant Program/Project Reviews	
2MA-15	Technical Performance Assessment Report	
Manufacturing/Test (MT)		
2MT-1	In-Process and Integrated Checkout Requirements Document	
2MT-2	Horizontal Acceptance Flight Requirements Document	
2MT-3	Preflight Checkout Requirements Document - Ferry and HFT	
2MT-4	Shuttle Certification Status Reports	
2MT-5	Master Verification Plan, Vols. III to IX	
2MT-6	(Reserved)	
2MT-7	Element Certification Status Report	
2MT-8	Materials Test Results Report	
2MT-9	Materials Test Requests	
Problem/Action (PA)		
2PA-1	Problem Report	
2PA-2	Open Problem List	
2PA-3	Problem Closeout and Explanations Report	
2PA-4	Failure and Unsatisfactory Condition Summary Report	

TABLE 7-I.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CONTINUED

(b) Documents submitted to SSPO for information - concluded

Number	Title
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Safety, Reliability, and Quality (SR)

2SR-1	Safety Analysis Report
2SR-2	Accident Report
2SR-3	NASA ALERT System Documentation
2SR-4	Failure Mode Effect Analysis (FMEA)
2SR-5	Vehicle and GSE Limited Life Item List
2SR-6	Project Parts List
2SR-7	Limited Life Waiver
2SR-8	Critical Items List
2SR-9	EEE Part Qualification Test Reports
2SR-10	EEE Parts Where Used Status Printout
2SR-11	Requests, Substitutions and Deviations, EEE Parts
2SR-12	Contamination Control Program Plan

Training (TR)

2TR-1	System Training Requirements Analysis Document
2TR-2	System Programmed Instruction Manuals

TABLE 7-I.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CONTINUED

(c) Documents submitted to SSPO only upon request - continued

Number	Title
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Configuration Baseline (CB)

3CB-1	KSC Station Set Specification
3CB-2	ICD Cross Reference Index

Engineering (EN)

3EN-1	(Reserved)
3EN-2	GSE Measurements List
3EN-3	Analyses/Evaluation/Studies

Management (MA)

3MA-1	Photography
3MA-2	Documentation Tree
3MA-3	GFE Element Procurement Package Data

Manufacturing/Test (MT)

3MT-1	Facility Activation/Deactivation Plans
3MT-2	Test Reports
3MT-3	Certification Requirements
3MT-4	Qualification Site Approval
3MT-5	Certification Test Request
3MT-6	Test Agency Report
3MT-7	Test Start Approval
3MT-8	Quick Look Report
3MT-9	Engineering Analysis Report
3MT-10	Certification Approval Request
3MT-11	Certified Hardware List
3MT-12	Subsystem Certification Plans

Safety, Reliability, and Quality (SR)

3SR-1	EEF Parts Specifications
3SR-2	Nonconformance Reporting
3SR-3	Workmanship Standards
3SR-4	Acceptance Data Package
3SR-5	EEF Part Application Analysis Report
3SR-6	(Reserved)
3SR-7	Limited Life Status Reports
3SR-8	Pressure Vessel Historical Data

CHANGE 2

TABLE 7-I.- INDEX OF LEVEL II INFORMATION REQUIREMENT - CONCLUDED

(c) Documents submitted to SSPO only upon request - concluded

<u>Number</u>	<u>Title</u>
3SR-9	(Reserved)
3SR-10	(Reserved)
3SR-11	Sampling Procedures
3SR-12	List of Critical Processes

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSFC FOR APPROVAL - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
<u>Configuration Baseline (CB)</u>					
1CE-1	(Reserved)				
1CE-2	(Reserved)				
1CB-3	Level II Change Request	R,S,J,M,K	LV	Level II Change Requests shall be used for proposing system level changes to NASA baselines. Documentation and processing requirements are contained in Vol. IV.	Vol. IV, para 4.3.1.3
1CE-4	Interface Control Document (ICD)	RX	LF	The system level interface control documents shall provide engineering and dimensional data sufficient to document the interface(s) between two or more program elements. Documentation and processing requirements are contained in Vol. IV. The ICD's will be referenced in Volume X of JSC-077C0.	Vol. IV, para 3.1.6.4 Vol. X, para 2.0
1CB-5	System Drawing Index	RX	LV	The drawings listed on the System Drawing Index will become a part of the Level II baseline when approved by the Program Office. This is, in effect, an extension of the System Specification for Program Office Level II configuration control. The System Drawing Index shall identify and relate the upper levels of the overall Space Shuttle system drawing system. The exact level of detail to which the drawing index extends will be determined by the requirements for Program Office control of configuration changes. As a minimum, identification of the top level system drawing, the interface drawings, the top level program element drawings, and lower level drawings as determined appropriate; draft due 21 days prior to SRR; final version due 21 days prior to system PDR; updates approved by the Program Office.	
1CB-6	Electromagnetic Compatibility Management Plan	RX	LF	This plan shall define the techniques by which electromagnetic compatibility (EMC) will be assured at the integrated system level and shall identify the method by which subsystems and equipments will be managed to support that goal. The EMC plan shall include provisions for protection from static discharge and lightning. The plan shall contain the following.	Vol. X, para 3.6.7
				a. Objectives applicable to design, procurement, test and analysis, which support the	

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSPO FOR APPROVAL - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				<p>EMC required of the overall system</p> <p>b. Identification of objectives to be imposed on subcontractors</p> <p>c. Guidelines for analysis of test data</p> <p>d. Methods established for corrective action necessary to the integrated system</p> <p>The initial submittal is due 10 work days prior to SRB; updates are due 10 work days prior to System PDR; subsequent updates as required.</p>	
<u>Engineering (EN)</u>					
1EN-1	Master Measurements List	RX,J,M	LP	<p>The list shall include all flight element measurements displayed or telemetered. Preliminary due 10 work days prior to system PDR; updated 10 work days prior to System CDR; subsequent updates as required. The GSE measurement list is described in data requirement 3EN-2.</p>	Vol. X
<u>Operations/Logistics (LG)</u>					
1LG-1	Orbiter Integrated Ground Operations Plan (HPT)	KX	LG	<p>The plan identifies the details at an outline level of the tasks, operations, tests, and checkout functions associated with preparation of the orbiter for flight and turnaround during the horizontal flight test program. Within this document shall be contained processing flow plans better to relate the various functions in terms of time, constraint, and potential parallelism. This plan shall also include definition of the routine maintenance and checkout operations required prior to each flight. A section shall be provided within this plan to define the equivalent data associated with acceptance flight test of vehicles other than those assigned to the horizontal flight test program.</p>	Vol. IX, para (TBD) MVP, Vol. I, Table 4.2-1
1LG-2	System Integrated Ground Operations Plan (VPT)	KX/RX	LG	<p>This document shall identify the details at an outline level of the tasks, operations, tests, and checkout functions associated with the preparation of each Shuttle element for mating and associated with preparation of the Shuttle stack for flight. Also included are the booster SRB recovery operations and the necessary descriptions to enable procedural preparation covering shipment of the SRB</p>	Vol. IX, para (TBD) MVP, Vol. I, Table 4.2-1

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSPO FOR APPROVAL - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				segments back to the casting plant. Within this document shall be contained processing flow plans to better relate the various functions in terms of time, constraints, and potential parallelism. This plan shall also include definition of the routine maintenance and checkout operations required prior to each flight.	
1LG-3	(Reserved)				
1LG-4	Integrated Logistics Schedules	S	IG	The Space Shuttle Program Office will develop and maintain the program logistics schedule using inputs from Shuttle project managers.	Vol. XII, para 10.2
<u>Management (MA)</u>					
1MA-1	Space Shuttle Level II Program Definition and Requirements (JSC-07700)	S	LV	This document contains program definition information and contains the Program Manager's Level II baseline requirements. All elements of the Program Manager's Level II baseline will be included in, attached to, or referenced from this document (JSC-07700). The requirements stated are applicable to all NASA Space Shuttle Program participants and certain of them are to be passed on to contractors/subcontractors. The document contents will be controlled by the Program Manager. For purposes of improved Management and utilization, the document will be produced in 18 volumes.	Table 7-v Vol. I, para 3.0
1MA-2	(Reserved)				
1MA-3	(Reserved)				
1MA-4	(Reserved)				
1MA-5	Program Operating Plan (POP)	SX,J,M,K	LR	Plan preparation instructions shall be provided via "calls" issued by the Program Manager, normally on 6-month intervals to support budget plans.	Vol. XV, para (TBD)
1MA-6	Element Contract Data	J,M,K	LV	These data shall provide the Program Office visibility into Element Contract development to assure that the Program-level requirements are properly included. This information shall be provided prior to RFP, prior to negotiations, and after ATP.	

CHANGE 2

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSEC FOR APPROVAL - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
1MA-7	Operational Documentation Requirements	KX	LG	The NASA must be prepared to accept the responsibility of sustaining engineering during the Space Shuttle operational period. Therefore, it is essential that certain data be made available to the operational site from all hardware/software developers/suppliers. The document states the requirements for the kinds of data to be provided: i.e., specifications, drawings, schematics, test data, pressure vessel history, handbooks, manuals, etc. to the component level where necessary. Further, it provides requirements for standard use of formats, symbology, etc. as necessary to assure useability by the operations activity.	Vol. XII, Appendix B
1MA-8	Management Plan, Shuttle Materials Control and Verification Program	J,M,K	LP	<p>This plan shall define the objectives, logic, procedures, required actions, responsibilities, management controls, and interrelationships with other Space Shuttle Level II Definitions and Requirements for implementing and maintaining a Materials Control and Verification Program for all materials used in Space Shuttle hardware, interfacing GSE and materials used in fabrication assembly processes. The plan will define materials management responsibilities for the procuring activity, its related contractors and for NASA intercenter coordination and will describe the methods to be used in the identification, selection, evaluation, verification, documentation, and reporting of materials usages in Space Shuttle hardware.</p> <p>The plan shall include procedures and instructions for a systematic and continuing program to report and control materials used, status, test evaluations, substitution, and verification. As a minimum, the plan prepared by the procurement activity in response to the Level II Program Definition Requirements, and implementation plans of its related suppliers/contractors, shall cover the following elements:</p> <ol style="list-style-type: none"> <u>Materials Identification</u> - Identification and documentation of materials used, both in original design and in any change. <u>Usage Evaluation</u> - Documentation of material uses and the comparison of test data to establish selection and test requirements. 	Vol. X, ref. doc. NHB 8060.1 (pg. 17)

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSFC FOR APPROVAL - CONTINUED

Number	Title	Source	CFR	Description/Comments	Reference
				<ul style="list-style-type: none"> c. <u>Testing</u> - Logic, procedures, and data documentation for any proposed test program to support materials screening and verification testing. Any material testing to be performed by the contractor will require prior NASA approval. d. <u>Hazard Removal</u> - Procedure involved in the removal of identified hazards. e. <u>Deviation Procedures</u> - Procedures involved in documenting and approving materials that do not meet the established requirements but are proposed for use in the spacecraft due to lack of replacement materials or other considerations. f. <u>As-Built Control</u> - Procedures involved in assuring that no material hazards are introduced between initial design and operational phase completion. g. <u>Reporting</u> - Procedures involved in establishing and maintaining a materials accountability, tracking and control data and information system used for recording and reporting materials data, usage, and control. h. <u>Final Review Procedures</u> - Procedures used to summarize the status of materials to permit certification on acceptability of a given design or a given configuration at designated hardware milestone reviews, such as PDR's, CDR's, FACI's, CARR's, FRR's, etc. i. <u>New Technology</u> - Identify areas of new test technology or technique improvement for consideration. 	
				EPO Shuttle Materials Control and Verification Program Management Plan shall be submitted to the SSFC.	
				<u>Manufacturing/Test (MT)</u>	
1MT-1	Master Verification Plan, Vols. I and II (JSC-07700-10-MVP-1 & -2)	S	LF	This plan consists of multiple volumes, the first two of which are system level and will require Program Office approval: Volume I shall provide the purpose and scope of the overall plan and shall describe the approach to the Shuttle System verification and verification process. It shall establish the guidelines and criteria to be applied throughout the Shuttle System and shall summarize	Vcl. X, para 6.2 Item 2MT-5

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSEC FOR APPROVAL - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				the total test program. Volume II shall describe the analysis, simulation, and test programs to be conducted on the Mated Space Shuttle vehicles. This volume shall identify the applicable combined element level requirements for verification, the method of verification, and shall allocate requirements to the Shuttle System or individual elements for verification. These two volumes of the Master Verification plan, when approved, shall become a part of the Program Manager's baseline by reference from Volume X of JSC-07700.	
1MT-2	Vertical Flight Test Requirements Document	RX	LF	The document shall define the test requirements to be demonstrated by each element for the flight portions of the vertical test program. Both flight worthiness and mission operational capability requirements shall be displayed. Flight worthiness shall be defined through flight 7, with mission operational capability requirements added as they become known and allocated to flights by the NASA.	MVP, Vol. I Table 4.2-1
1MT-3	(Reserved)				
1MT-4	Horizontal Flight Test Requirements Document	RX	NA	The document shall provide identification of all test requirements applicable to the horizontal flight test program including airworthiness demonstration requirements for Orbiters 1 and 2.	MVP, Vol. I, Table 4.2-1
1MT-5	Preflight Check-out Requirements Document VFT	RX	LF	This document defines the preflight check-out requirements for the Shuttle flight vehicle from which ground turnaround and prelaunch checkout plans and procedures are prepared. It contains pass/fail limits which must be satisfied to prepare each element of the Space Shuttle (including combined elements) for vertical flight. Also includes general requirements regarding retest, constraints, data, quality assurance and safety. Submittal required 24 months prior to start of VFI program.	MVP, Vol. I, Table 4.1-1
				<u>Safety, Reliability and Quality (SR)</u>	
1SR-1	EEE Part Qualification Test Request	J,M,K	NA	The request shall serve as the vehicle for coordinating approval to expend effort for qualifying flight equipment and critical GSE EEE Parts. They shall contain the following information:	

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSPC FOR APPROVAL - CONCLUDED

Number	Title	Source	OPR	Description/Comments	Reference
				<ul style="list-style-type: none"> a. Identification of controlling specification to be used in conducting required tests on individual FFE part types, and part/name/number identification. b. Identification of test agency and facility to be used c. Detailed description of qualification test method, outline of schedule/cost impact and using configuration involved. 	

Submittal due 5 working days after FFC approval but no later than 90 days prior to part qualification test initiation.

Training (TF)

1TR-1	System Training Plan	JX	LA-2	The plan shall identify training standards, ground rules and procedures, formats, and specific plans of action for implementation and operation of a Space Shuttle systems training program and the preparation of training-related documentation to meet Space Shuttle program training needs. The contents shall be in accordance with the System Training Requirements Analysis document. The plan shall define categories of NASA trainees, types of training and training standards, and formats and procedures for the Space Shuttle systems training program. The plan shall also include requirements for a description of the vehicle familiarization manual and programmed instructional manuals to be prepared by systems training instructors in addition to their activities as classroom instructors.	
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TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPB</u>	<u>Description/Comments</u>	<u>Reference</u>
<u>Configuration Baseline (CB)</u>					
2CB-1	End Item Specification	J,M,K	EPO	The end item specification shall provide complete performance, interface, design, test/verification, and acceptance requirements for the item. Subject matter within the scope of the sections of the specification shall be sufficiently structured to provide traceability of requirements allocated from higher order specification (e.g., program, system, or element) and associated interface control documentation. Specification format shall be as shown in Volume X, paragraph 3.6.18. The end item specification shall be maintained current with the approved baselined technical requirements. All changes/revisions to the document shall be identified and formally released. All change/revision activity shall be accomplished in a consistent and orderly manner to assure traceability of requirement and compatibility of changed/revised configuration with those that remain unchanged. All changes to the document shall be accomplished by specification change notices (SCN) appropriately annotated relative to the progressive baseline level(s).	Vol. X, para 1.1.3 and para 3.6.18
2CB-2	Drawings and Associated Lists	J,M,K	EPO	Drawings and associated lists shall be submitted concurrent with the individual drawing release in the form of 35mm diazo duplicate aperture cards. They shall be prepared in accordance with the requirements of Vol. X, para. 3.6.10. Supplementary requirements or exceptions to the Vol. X requirements may be negotiated with each design activity with the objective of using in-place design practices to the fullest extent practical, thereby minimizing any cost impact. However, all such exceptions and deviations shall be submitted for Program Office approval to assure that the resulting system drawing file has the necessary degree of compatibility to satisfy operational requirements. The basic requirements of MIL-D-100C and NHB 1440.4A, as applied in Vol. X, Paragraph 3.6.10, shall be the point of departure for identifying supplementary requirements or deviations to the Program Office.	Vol. X, para 3.6.10

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSIC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>CFE</u>	<u>Description/Comments</u>	<u>Reference</u>
2CB-3	Space Shuttle Program Baseline Activity Index and Status Report	RX	LV	<p>This report shall list the documentation that establishes the baseline configuration identification for the Space Shuttle system and items. The report shall list the controlling documentation, including all changes, approved and accepted by the NASA as representing the current baseline description of the Space Shuttle system, elements, and items. Such documentation shall include requirements documents, specifications, plans, interfaces and design documentation, and reports approved as a result of program reviews and design reviews. The report shall be maintained current in accordance with configuration management requirements and approved Change Control Board Directives.</p> <p>The report shall also identify status for the following:</p> <ol style="list-style-type: none"> Number of Engineering Change Proposals outstanding; i.e., pending approval and incorporation Number of Class II changes approved and released Number of changes (mod kits, etc.) pending incorporation by vehicle support equipment, effectivity (change points) and site 	Vol. IV, para 5.3
2CB-4	Space Shuttle Integrated Program ICD Status List	RX	LV	<p>The report shall denote the current status of Space Shuttle Program interface control documentation, approved or in process, and approved changes to baselined ICD's and shall identify the Space Shuttle Program interface control documents by ICD number, contract number, title, interface area, baseline level related system or end item specification, and vehicle or site effectivity. The report shall include approval authorization, related contractor change proposal data (i.e. how implemented on contract and contractor acceptance or rejection), appropriate baseline accountability data and pertinent remarks.</p>	Vol. IV, para 5.2
2CB-5	(Reserved)				
2CB-6	Station Set Specification (Development and Test Sites)	J,M	EPO	<p>The station set specification shall contain performance, design, and installation requirements including functional performance requirements of integrated support equipment performance timelines, equipment complement, equipment</p>	Vol. X, para 1.1.3

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSPO FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				installation, external interfaces, natural environment, induced environment, allocation of functions to ground-support-equipment items, personnel and equipment safety, equipment life span, reliability, maintainability, materials, parts and processes, electromagnetic radiation, identification and marking, workmanship, and human engineering; also contains station set test and checkout requirements, including special item testing, responsibility, test routing, sequence data, and quality conformance.	
2CB-7	KSC Station Set Requirements	KX	KSC	The station set specification shall contain performance, design, and installation requirements including functional performance requirements of integrated support equipment performance timelines, equipment complement, equipment installation, external interfaces, natural environment, induced environment, allocation of functions to ground-support-equipment items, personnel and equipment safety, equipment life span, reliability, maintainability, materials, parts and processes, electromagnetic radiation, identification and marking, workmanship, and human engineering; also contains station set test and checkout requirements, including special item testing, responsibility, test routing, sequence data, and quality conformance.	Vol. X, para 1.1.3 Vol. IX, para (TBD)

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFC FOR INFORMATION - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
<u>Engineering (EN)</u>					
2EN-1	Mass Properties Reporting	RX,J,M	LF	Mass properties reporting shall be accomplished in accordance with the Mass Properties Reporting Plan, Table 7-XVI.	Table 7-XVI
2EN-2	(Reserved)				
2EN-3	(Reserved)				
2EN-4	System Wind Tunnel Test Status Report	RX	EX	<p>This report shall include the following items of information.</p> <ol style="list-style-type: none"> Brief description of each test, including test number, dates, purpose, model, facility, test variable, hours and runs Test schedules Test conductors Documentation Status of test and model <p>This report shall be prepared by computer punched cards. This program will be operated by NASA JSC to support the System Contractor.</p>	
2EN-5	Drawing Release Status Report	J,M,K	EPO	<p>This monthly report is prepared for the Orbiter, SSME, External Tanks, SRB, and operational site. Design activities shall develop and maintain this report from internal engineering schedules. This report is a cumulative plot of engineering drawings actually released, compared against the planned release. Report is due not later than the 15th day of each calendar month to the Space Shuttle Program Office. The report shall contain the following.</p> <ol style="list-style-type: none"> Planned Release: A time-phased cum baseline of the number of planned drawing releases shall be established. Actual Release: The number of actual drawings released during the contractor's accounting month shall be plotted each month against the established baseline. Variance from this baseline exceeding deviation factors established by the SSC's shall be explained. Baseline Change: Changes to the baseline planned release rate that are determined 	

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFO FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				appropriate by the design activity, shall be shown as a variance to item 1 above.	
2EN-6	Requirements/ Definition Documents	J,M	EPO	These documents are to be used early in the program and serve as a repository for requirements development and design definition data. They are to be controlled by the design activity preliminary to incorporation into formal specifications. Sample content descriptions and formats are shown in tables 7-VI and 7-VII, respectively.	Table 7-VI, and 7-VII
2EN-7	Space Shuttle Definition Handbook	RX	IF	This document shall describe the Space Shuttle configuration, performance capability, operations, element interfaces, and support equipment station sets. This document shall serve an early program function of providing the description of the design solutions for program requirements. This document shall be maintained by the System Contractor until its usefulness is superseded by baselined specifications, drawings, schematics, etc.	
2EN-8	(Reserved)				
2EN-9	Integrated Schematics	RX,J,M,K	IF	Integrated schematics shall depict functional flow, intersubsystem, interelement, and support equipment/facility relationship and shall be prepared in various levels including subsystem block diagrams, shuttle vehicle integrated schematics, and vehicle support equipment, integrated schematics, as shown in Table 7-XVII.	Table 7-XVII Vol. X, para 3.6.10
2EN-10	Software Development Plan	J,M,K	EPO	This plan shall describe the top-level management considerations, as well as development, maintenance, and change cycles. The document shall define techniques and controls necessary in these cycles.	Vol. XVIII, para (TBD)
2EN-11	Control Materials List of Material Permitted in and around the Vehicle during Ground Operations	J,M,KX	KSC	A detailed materials list shall be provided by each EPC for materials approved for use in and around the vehicle during ground operations. The list shall include all nondeliverable items such as cleaning fluids, repair components, protective covers, etc., used during ground operations. The list shall also include quantity or usage limitation and any other limitations as required.	Vol. X, para 3.6.2.3
2EN-12	Materials Properties Deviation/ Waiver Requests	J,M,K	EPC	Materials deviations/waivers shall be required as "Class I" changes in accordance with JSC-C7700 Configuration Management Requirements Space Shuttle Level II Program Definition and Requirements for all	Vol. X, para 3.6.2.3

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFO FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPF</u>	<u>Description/Comments</u>	<u>Reference</u>
				materials that do not meet established acceptance requirements. All materials deviation/waivers shall provide sufficient rationale and justification as to why materials not meeting the requirements are considered acceptable for Space Shuttle usage and do not constitute an unacceptable hazard.	
				The following information shall be provided as a minimum:	
				a. Detail drawing and dash number	
				b. Major assembly drawing and dash number	
				c. Originating department or group	
				d. Shuttle Element	
				e. Number of parts required per end-item	
				f. Material name, generic (e.g., silicone, elastomer, etc.)	
				g. Manufacturers designation (e.g. EFCM 828, etc.)	
				h. Manufacturer (e.g., Shell Chemical; etc.)	
				i. Material specification	
				j. Specification source	
				k. End item effectivity	
				l. Location	
				m. Weight (nonmetallics only)	
				n. Surface area (nonmetallics only)	
				c. Reason for request	
				f. Test data	
				q. Rationale and applicable photographs	
				r. Alternate materials considered	
				s. Additional information	
				Deviation/waiver submittal schedule shall be as required.	
2EN-13	Worksheets, Standard for Accountability, Control, Tracking, Information and Data on Materials	J,M,K	EPO	Materials worksheets shall be used in implementing a systematic and continuing materials configuration management program to document, report, and control Shuttle materials usage, status, test, evaluation, substitution, and verification. Requirements, procedures, instructions, and responsibilities for preparing materials worksheets shall be generated by the procuring activity for its related suppliers/contractors.	Vcl. X, para 3.6.2.3
				Shuttle hardware materials usages will be identified and documented on Standard Materials Worksheets, CSC Form 1392 (or approved equivalent). Provisions will be made for transmittal of the	

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSEC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				standard materials worksheets to the central data storage and retrieval system maintained by the System Contractor.	
2EN-14	Simulation Plan	J,M,K	EPC	The plan shall describe the top-level simulation approach, hardware utilization, and facility time-phasing for real-time, closed-loop studies and tests using analog, digital, or hybrid digital-analog computers and varying degrees of simulated developmental, or prototype hardware.	Vol. XVIII, para (TBD)
<u>Operations/Logistics (LG)</u>					
2LG-1	Space Shuttle Operational Data Book	SX,J,M,K	EFO	<p>These data shall be used to support NASA and the contractor in the mission design, flight planning, flight crew/flight controller training, hardware/software evaluation and realtime support activities. The data shall include the following.</p> <ol style="list-style-type: none"> 1. Hardware performance characteristics: Includes configuration, all subsystem performance data, and payload support system data 2. Operational limitations and constraints: Subsystem performance limitations and constraints along with rationale or operational results of exceeding a defined limitation <p>The data shall be prepared in formats permitting use by NASA in various documents. Details as to format will be as agreed upon with the NASA. Whenever practical, previously generated information will be provided in lieu of rewriting for flight operations procedures use. As results of ground tests, flight tests, and laboratory simulations become available, the data will be updated using traceable information.</p>	Vol. VIII para (TBD)
2LG-2	System Turn-around Processing Flows	KX/RX	KSC	The flow shall show the maximum level of detail possible consistent with the vehicle configuration and depth of subsystem design. At a minimum, the VFT flows shall include SFE recovery, orbiter landing, safing, maintenance, test and checkout, refurbishment, payload integration, mating, pad	Vol. IX, para (TBD)

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSPO FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OFF</u>	<u>Description/Comments</u>	<u>Reference</u>
				prelaunch operations, and countdown. The PFT flows should cover the sequencing of all tasks such as preflight preparation, ground support, postlanding saving, maintenance, ground test, checkout and refurbishment for the next flight.	
2LG-3	Maintainability Status Report	J,M	EPC	(See Vol. XII Ref.)	Vol. XII, para 4.3.2.12
2LG-4	Logistics Support Plan	J,M,KX	EPC	This plan defines the approach for the development and implementation of a logistics support program for the Space Shuttle elements during the development phase and during transition to the operational phase. (Includes maintainability and transportation planning).	Vol. XII para 2.2.c, para 4.3.2.1, para 9.2
<u>Management (MA)</u>					
2MA-1	NASA Design Activity/Contractor Management Plan	J,M,K	EPO	The plan shall describe the element approach to managing the Project, with reference to internal procedures that will enable an audit of his approach. The plan shall cover the activities of the element in support of the Space Shuttle Program from initiation through completion of effort. The element approach to accomplishing the intent of the Space Shuttle Level II program requirements shall include the following areas: <ul style="list-style-type: none"> a. Program management b. Engineering management c. Manufacturing management d. Quality assurance management e. Logistics management f. Test management g. Operations management An index shall be included of internal operating directives and procedures in these areas with discussion as to how they will be utilized in managing the program.	Vol. II
2MA-2	Expanded Work Breakdown Structure (WBS)	J,M,K	EPO	The expanded WBS shall identify how work is divided into small units of effort for optimum management of the program and shall consist of an indented list of element titles, a dictionary defining the scope of each element (for the types	Vol. III, para 4.0

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				of tasks included in each element), and a diagram to indicate element relationships more clearly.	
2MA-3	Project Schedule	J,M,K	EFO	The schedule shall be keyed to the Space Shuttle Program Schedule and provide supplementary information at the project summary level. The schedule shall present the overall plan for accomplishment of tasks to meet the basic objectives of the Space Shuttle Program. The schedule shall display a traceable flow from authority-to-proceed through start of fabrication, major procurements, major development testings, initial flight, refurbishment, and subsequent operational flight. The schedule shall display time-phased events and activities of program elements related to major requirement reviews, design reviews, acceptance reviews, readiness reviews, major ground test articles and test programs, trainers, mockups and models, design and development, flight hardware and tests, government-furnished equipment (GFE), major facilities, and support equipment. The schedule shall be prepared in Gantt chart format.	Vol. III, para 6.0
2MA-4	Management Information Center (MIC) Audiovisual Material	SX,J,M,K	LV	This material consists of the aggregation of audiovisual information to be furnished to the Program MIC.	Vol. III, para 3.0
2MA-5	Schedule Technical, and Resources Report	J,M,K	EFO	This report shall contain Performance Management System (PMS) data for schedule, cost, and technical assessments. The following categories of information shall be presented, however, the sequence and sub-division within the report are at the option of the project office. <ul style="list-style-type: none"> a. Summary: Contains project milestones, status data, technical data, narrative analyses, integrated cost-schedule performance analyses (including earned value) and monthly progress reporting will be summarized. b. Schedule: Lower level schedules; i.e., product schedules, selected WBS element schedules, and significant area schedules, "by exception" lowest level WBS milestones status, narrative variance analyses with selected milestone variances and attendant program impact data. 	Vol. III, para 2.0

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSPO FOR INFORMATION - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				<ul style="list-style-type: none"> c. Resources: Manning and financial information shall be reported monthly. Also reported shall be earned value information consisting of planned value of work scheduled (PVWS), planned value of work accomplished (PVWA), actual costs (AC), schedule variances, (PVWA-PVWS) and cost variances (PVWA-AC). d. Integrated cost, schedule and technical performance analyses and trends: Selected analyses and trend graphics providing integrated assessment of cost, schedule, and technical performance. e. Monthly progress reporting: Select monthly progress reporting from functional organizations as required for significant items or to support the summary progress reporting in item 1 preceding. 	
2MA-6	System Status Report	SX	LV	The report shall present the results of analysis of system/project/contractor technical and schedule performance data. It will be prepared from data available to the SSPO MIC and supporting analysis/data from project and contractor MIC's, as appropriate.	Vol. III, para 4.2.2.2, (Appx. E)
2MA-7	Project Budget Report	J,M,K	LR	<p>This report provides project status against the most current ECF. Further, it shall assist program management in the control of resources by identifying the amount and location of management reserves or contingency resources. The report shall contain at least the following items.</p> <ul style="list-style-type: none"> a. Rate curves, actual vs. ECF b. Cumulative curves, actual vs. PCF c. Project reserve dollars and changes budget 	Vol. XV, para (TEC)
2MA-8	NASA Form 533M Report	J,M,K	EPO	The NASA Form 533M is a monthly cost report required by NMI SEC1.1A. This report shall be completed by the contractor in accordance with the instructions on the reverse side of the form and additional instructions that are set forth in NASA Handbook 9501.2A. The Monthly Cost Report (NASA Form 533M) is due on a negotiated date normally not later than 10 operating days following the close of the contractor's monthly accounting period. A copy of this report is due not later than the 15th day of each month to the Space Shuttle Program Office.	Vol. III, para 6.7.9 (Appx. A)

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSPO FOR INFORMATION - CONTINUED

Number	Title	Source	OPF	Description/Comments	Reference
2MA-9	NASA Form 533P Report (Optional - may be used in place of 533M, above)	J,M,K	EFO	The NASA Form 533P is an optional monthly cost and performance report. This report shall be completed by the contractor in accordance with the instructions on the reverse side of the form and additional instructions that are set forth in NASA Handbook 9501.2A. The Performance Analysis Report (NASA Form 533P) is due on a negotiated date normally not later than 10 operating days following the close of the contractor's monthly accounting period. A copy of this report is due not later than the 15th day of each month to the Space Shuttle Program Office.	Vol. III, para 6.7.9 (Appx A)
2MA-10	NASA Form 533Q Report	J,M,K	EFO	The NASA Form 533Q is a quarterly report for obtaining costs projections required by NMI 9501.1A. This report shall be completed by the contractor in accordance with the instructions on the reverse side of the form and additional instructions that are set forth in NASA Handbook 9501.2A. The Quarterly Cost Report (NASA Form 533Q) is due on a quarterly frequency date normally not later than the 15th day of the month preceding the first quarter being forecast. A copy of this report is due not later than the 20th day of the month preceding the first quarter being forecast to the Space Shuttle Program Office.	Vol. III, para 6.7.9 (Appx. A)
2MA-11	Cost per Flight Report			(TED)	Vol. XVI, para (TED)
2MA-12	Information Requirements Document (IRD)	J,M,K	EFO	The document shall specify requirements for information products to be delivered or made available. The document shall contain the following sections. <ul style="list-style-type: none"> a. General: Establishes information type categories and submittal identification requirements common to all information items b. Information requirements descriptions: Compiles specific information item descriptions defining submittal types, schedules, NASA office of primary responsibility, information use, interrelationships, scope, content, and, where pertinent, format and maintenance c. Information maintenance: Establishes maintenance procedures for specific categories of information items as referenced 	Vol. V, Table 7-III

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFO FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>CPF</u>	<u>Description/Comments</u>	<u>Reference</u>
				in the information requirements descriptions	
2MA-13	Information Accession List	SX,J,M,K	EPO	<p>The list shall be a cumulative listing of available Project or Program documentation and shall identify data released to date as well as data released during the past 30 days and how such data may be obtained. The list shall contain the following elements.</p> <ul style="list-style-type: none"> a. Related work breakdown structure (WBS) number b. Document identification (document number, title, and date) c. Document security classification <p>Monthly updates shall be manual listings or tab runs.</p>	Vol. V, para 3.3
2MA-14	Review Data (Handouts) from Significant Program/Project Reviews	S,J,M,K	EPC	The purpose of this information requirement is to assure that the subject data is properly disseminated to other centers for file purposes in addition to the customary "Handout" at the review.	Vol. V, Table 7-III
2MA-15	Technical Performance Assessment Reporting	SX,J,M,K	EPC	This reporting provides visibility of actual and potential technical problems and progress toward meeting technical specification and development goals for selected requirements.	Vol. III, app. A
<u>Manufacturing/Test (MT)</u>					
2MT-1	In-Process and Integrated Checkout Requirements Document	J,M	EPC	Defines factory acceptance checkout requirements from which the checkout plans and procedures are prepared. Contains detail requirements with pass/fail limits which must be satisfied during factory checkout. Also provides general requirements regarding retest, constraints, data, quality and safety. Supports element PDF & CDS.	MVP, Vol. I fig. 4.1-1
2MT-2	Horizontal Acceptance Flight Requirements Document	J	MA	Defines the Orbiter acceptance checkout requirements from which the acceptance flight checkout plans and procedures will be prepared. Contains detail acceptance requirements with pass/fail limits which must be satisfied. Also provides general requirements regarding retest, constraints, data,	MVP, Vol. I

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFC FOR INFORMATION - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				quality and safety. Submittal 12 months prior to start of horizontal flight test.	
2MT-3	Preflight Check-out Reqmts Document-Ferry and HFT	J	MA	Defines the Orbiter preflight checkout requirements from which the ground turnaround and preflight plans and procedures are prepared to support ferry operation and EFT. Contains detailed requirements with pass/fail limits which must be satisfied to prepare the Orbiter for each horizontal flight. Also general requirements regarding retest, constraints, data, quality and safety. Submittal 12 months prior to start of horizontal flight test.	MVP, Vol. I
2MT-4	Shuttle Certification Status Report	RX	IF	This report identifies and monitors the certification status of configurations identified in element subsystem certification plans and includes schedules for test requests, test article availability test implementation, test analysis reports, and approval. Initial submittal of integrated status report due 10 work days prior to initial EDR. Updates are due every quarter, until significant qualification activity begins; monthly thereafter until first manned orbital flight (FMOF).	MVP, Vol. I, Table 4.2-1
2MT-5	Master Verification Plan, Vols. III to IX	J,M,K	EPO	Volumes III to IX of the master verification plan are element verification plans for the orbiter, SRB, external tank, main engine elements, payload and payload carrier, launch and landing site, software, respectively, and contain element-level requirements and planning information similar to that of Volume II. Element volumes shall be prepared by respective element contractors and consist of element development, verification, analysis, and test plans including associated support documentation requirements. Submittal 5 working days following EEC approval but not later than EDR.	Item 1MT-1
2MT-6	(Reserved)				
2MT-7	Element Certification Status Report	J,M,K	EPO	This report identifies and monitors the certification status of configurations identified in element subsystem plans and includes: <ul style="list-style-type: none"> a. Planned certification test/analysis schedule and status b. Identity of current test/analysis by CR (certification requirement) number c. Test hardware documentation status 	MVP Vol. I, Table 4.2-1

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				d. Test agency identity e. Approval status	
				Submittal schedule is monthly starting with first scheduled certification test or analysis.	
2MT-8	Report, Materials Test Results	J,M,K	EPC	Reports of the results of all materials screening tests, configuration tests, and submitted on a continued basis. Each report will state the identification of the individual materials or configuration, the materials intended use, material geometric configuration, the test objectives, details of the test setup, and test procedure conforming to an approved test plan. It will describe the measuring equipment used and its calibrated accuracy. All test data and observations, including complete details on anomalies and failures, and applicable photographs will be presented. The test report shall include the requirement for review and approval by the cognizant test engineer and quality control.	Vol. X, para 3.6.2.3, NHB 8060.1
2MT-9	Materials Tests Requests	J,M,K	EPC	All individual materials, configurations, and systems requests for testing shall be submitted to the responsible group that has the overall engineering responsibility for materials control and verification. The applicable EEC's organization assigned this responsibility shall review, disposition and track all materials test requests. The supplier/contractor submitting the test request shall identify itself and submit rationale for the requested testing.	Vol. X, Para 3.6.2.3 NHB 8060.1
				<u>Problems/Action (PA)</u>	
2PA-1	Problem Report	J,M,K	EPC	All reportable problems shall be reported by the most expeditious methods; i.e., telecopier, telephone, telegraph, personal courier, etc. Problems shall be reported to the NASA within 24 hours of occurrence or detection for each contractor or subcontractor tier. Documented report due within 5 days of reportable item identification. Subsequent updates as required. The scope of the problem reports varies according to the nature of the problem.	NHB 5300.4(1D), ID301, para 6

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSEC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				<p>a. All problems that occur during or subsequent to acceptance testing of flight hardware and launch operations essential ground support equipment, and ground support equipment the malfunction of which could create a safety hazard or induce defects into spacecraft equipment shall be reported. Problems that occur prior to acceptance testing that will, or have the potential to, adversely affect safety, contribute to the delay of a scheduled event, result in a design change or that occur during certification testing shall also be reported. Report contents shall be as shown in table 7-VIII.</p> <p>b. A documented report containing additional information shall be provided within 5 days of reportable item identification. Report content shall be as shown in table 7-IX.</p>	Table 7-VIII
2PA-2	Open Problem List	RX	EPO	<p>This list shall cover data on all reported problems that have not yet been dispositioned and contain the information shown in table 7-X. The open problem list shall be published and distributed monthly until the beginning of qualification/certification tests, and weekly thereafter. Initial submittal due 1 week after accumulation of 10 or more reportable problems. Supplemental publications/updates shall be provided as required to support specific test or flight/launch events/milestones.</p>	Table 7-X; NHB 5300.4(1D), ID301, para 6
2PA-3	Problem Closeout and Explanations Report	J,M,K	EPO	<p>The report shall document efforts successfully determining the cause of a problem for which corrective action has been established and documentation released to implement corrective action and shall document efforts taken to determine the cause of a problem and failing this, assurance that recurrence of the problem during a mission can be tolerated and that procedures to nullify the effects of the problem have been formulated. Initial submittal due 21 days after first problem report, updated continually as problem closeout/explanations occur. The reports shall contain the information listed in table 7-XI.</p>	Table 7-XI; Vol. XIII, ID301, para 6

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFO FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
2PA-4	Failure and Unsatisfactory Condition Summary Report	RX,J,M,K	EPC	This report provides a summary of reportable failure and unsatisfactory condition data for the Space Shuttle system to facilitate NASA management visibility and monitoring of problem information. Details are to be defined through coordination between NASA Centers and System Contractor.	NHB 5300.4(1D) ID301, para 6
<u>Safety, Reliability, and Quality (SR)</u>					
2SR-1	Safety Analysis Report	J,M,K	EPC	The report shall provide safety assessment and management visibility of identified hazards and shall include as a minimum (1) results of hazard analyses, (2) a record of acceptable and unacceptable risks, (3) a record and current status of residual hazards, (4) a list of safety requirements in element and subsystem specifications including a cross-reference to the specification paragraphs. Initial submittal of items (1), (2) and (3) due prior to ERF's, subsequent updates as required. Submittal of item (4) due 2 weeks after submittal of appropriate specifications. For specific information to be included in this report refer to table 7-XV.	NHB 5300.4(1D), ID201, para 1 Table 7-XV
2SR-2	Accident Report	J,M,K	EPC	Reports of mishaps, accidents/incidents, including injuries to personnel and damage to facilities occurring during manufacturing, testing, and operations affecting space flight hardware, related GSE or GFE, or the public safety, shall be reported to the Contracting Officer or his designated representative. For mishaps, accidents/incidents occurring at facilities operated by the prime contractor, the reporting shall be as follows: (1) Mishaps resulting in death, or injuries requiring medical treatment, or damage to equipment or property, or near misses (an occurrence that could have resulted in an accident) shall be reported within 12 hours; (2) In addition, any mishaps, regardless of personnel injuries or dollar value of property damage that will or may affect program development schedule or performance shall be reported by telephone and TWX within 12 hours; (3) The report format shall satisfy the "recordkeeping requirements" of CSFA.	NHB 5300.4(1D), ID200, para 8

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSPO FOR INFORMATION - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
2SR-3	NASA ALERT System Documentation	J,M,K	EPO	<p>Problems with parts and materials are transmitted to contractors using the NASA ALERT system. These problems are investigated by the contractors and, when usage of the alerted item is revealed, a response identifying resolution, and/or cost and schedule impact, is submitted to the applicable EPO.</p> <p>The ALERT responses received and the action taken by each EPO shall be submitted to the SSPC for information.</p> <p>Submitted 5 working days following EPO receipt and appropriate action, except during near to launch times when ALERTs will be closed in an expeditious manner.</p>	NHB 5300.4 (1D), ID301, para 7
2SR-4	Failure Mode and Effect Analysis (FMEA)	J,M,K	EPO	These analyses shall contain the information shown in table 7-XII. Submittal due 5 work days after EPO approval but no later than milestone reviews (PDR, CDR, FFR).	Table 7-XII; NHB 5300.4 (1D), ID301, para 3
2SR-5	Vehicle and GSE Limited Life Items List	J,M,KX	EPO	<p>The lists shall contain the following information.</p> <p>a. Time/cycle significant items list</p> <ol style="list-style-type: none"> 1. Definition of criteria for selection 2. Equipment requiring action such as inspection, maintenance, or replacement, giving milestone points and replacement points, and, where required, special measuring devices 3. General requirements for acquisition of operating time/cycle data <p>b. Age-controlled item action list</p> <ol style="list-style-type: none"> 1. Definition of criteria for selection 2. Age life limits for age-controlled items and assemblies and periodic action required for monitoring and control of these items 3. Requirements for historical data records to verify that age-sensitive items are controlled within acceptable limits <p>Submittal of lists 5 working days following acceptance by EPO.</p>	NHB 5300.4 (1D), ID301, para 4 Vol. XII, para 1.5.7

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSEC FOR INFORMATION - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
2SR-6	Project Parts List	J,K,M	EPO	<p>This document shall contain the following:</p> <ol style="list-style-type: none"> a. List of preevaluated (qualified) general usage controlled EEE parts by generic part type and name, common designation, controlling specification number(s), identification of authorized sources, and package type, as applicable. In addition, it will contain: <ol style="list-style-type: none"> 1. Reference to qualification status and a summary of pertinent application information and environmental criteria for each type. 2. Pertinent derating criteria for each EEE part type. 3. Identification of limited life items 4. Backward traceability 5. Selection criteria for including parts 6. Criteria for selecting alternate parts b. List of preevaluated (qualified) general usage mechanical and fluid parts. <ol style="list-style-type: none"> 1. Selection criteria for including parts 2. Criteria for selecting alternate parts <p>Initial submittal due ten working days prior to SRR, deltas monthly until system ERF and reissues as released internally by each EPC. Quarterly thereafter.</p>	NHB 5300.4(1D) ID301, para 8
2SR-7	Limited Life Waiver	J,M,KX	EPO	<p>The waiver shall document instances where an item has exceeded its time/cycle limit specified in applicable process specifications and rationale for accepting such items for flight or in support of flight and include vehicle installed hardware and launch essential GSE. The waiver shall contain the item name, number, serial number time or cycle limit, reason the item has (or will) exceed its time/cycle limit, and rationale for accepting the item for flight or proposed action. Submittal 5 days following EPC approval of waiver.</p>	NHB 5300.4(1D), ID301, para 4
2SR-8	Critical Items List	J,M,K	NA	<p>The critical items list shall contain the information shown in table 7-XIII. Submittal 5 working days following EPC approval but no later than milestone review (PLR,CIR, FRR).</p>	NHB 5300.4(1D), ID301, para 3

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFO FOR INFORMATION - CONTINUED

Number	Title	Source	OPF	Description/Comments	Reference
2SR-9	EEE Part Qualification Test Report	J,M,K	EPC	<p>The report shall cover each part newly qualified by test to its specification. The report shall include the following:</p> <ul style="list-style-type: none"> a. Reference to related qualification test plan/description of test. b. Sample size, measurements taken, test procedure, sequence, equipment used, and acceptance criteria. c. Identification of measurements outside acceptance criteria, identification of all failures, failure analysis. d. Statement as to successfulness of test, and qualification status of the part. e. Reference to the controlling specification to which the qualification is applicable. 	NHB 5300.4(1D) ID301, para 8
2SR-10	EEE Parts Where Used Status Printout	J,K,M	EPO	<p>The printout identifies flight equipment and launch essential GSE EEE parts used in contractor, subcontractor, and supplier equipment design applications. The content of the printout should include identification of parts by generic part name and type, common designation. Specification control drawing (e.g. ME number) manufacturer's H4 code or name, manufacturer's part number, qualification status, quantity used per application and component (black box) part number.</p> <p>The format of the printout shall be indexed by the following typical headings followed by the remaining data listed above:</p> <ul style="list-style-type: none"> a. Generic part name and type and common designation (e.g., diode, zener, IN297C). b. Part manufacturer H4 code or name (H4 code is preferred). c. Component (black box) part number (e.g., MEXXX-XXXX). <p>Submittal is due within 5 days from receipt by EEC. Updates will be submitted as required, but not more frequently than monthly.</p>	NHB 5300.4(1D) ID301, para 8
2SR-11	Request, Substitutions, And Deviations, EEE Parts	J,M,K	NA	<p>The deviation of substitution requests shall, as a minimum, contain the information in table 7-XIV. Submittal to SSFC for approval within 5 work days following EEC approval.</p>	NHB 5300.4(1D) ID301, para 8 Table 7-XIV

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSEC FOR INFORMATION - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
2SR-12	Contamination Control Program Plan	J,K,M	EPC	This document shall describe the overall organized approach for implementation of an effective contamination control program. The program described shall define the total planned contamination control system from design concept through subcontracting, fabrication, assembly, test, delivery, and operational lifetime of the contract items. Contamination controls and cleanliness levels shall be compatible with the most contamination sensitive fluids and design features involved. Controls for interface points for GSE, flight hardware, and payload shall be included.	Vol. X, para 3.6.12.1
<u>Training (TFR)</u>					
2TR-1	System Training Requirements Analysis Document	RX	CD	<p>The document shall describe the data and conclusions resulting from the Space Shuttle system training requirements analysis conducted at JSC by the System Contractor. The document shall identify NASA needs for personnel trained in Space Shuttle systems, describe the technical nature of such needs, define a training program to satisfy the requirements, and establish guidelines for the preparation of the Systems Training Plan. The document shall be in three sections.</p> <p>a. Training plan requirements: A description and ground rules for preparing two-part Space Shuttle System Training Plan</p> <p>b. Training requirement: A summary of requirements and training for each of the five categories of Space Shuttle system training:</p> <ol style="list-style-type: none"> 1. General Purpose Briefing 2. Flight Personnel Training (and Instructor Participation in Operations Handbook Development) 3. Flight Controller Training (and Contents and Preparation of Programmed Instruction Manuals) 4. Mission Support Training 5. Ground Operations Training 	Vol. (TBD)

TABLE 7-III.- DOCUMENTS SUBMITTED TO SSPO FOR INFORMATION - CONCLUDED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				<p>c. Training program: A description of curriculum, schedules, and calendar-phased student loads needed to satisfy training requirements</p> <p>The document shall be published only once during the Space Shuttle Program and shall not be subject to revision thereafter. The analysis document shall be used as the basis for preparing the Space Shuttle System Training Plan.</p>	
2TR-2	System Programmed Instruction Manuals	RX	CD	<p>System topic structure for identification of manuals will be initially defined in the Systems Training Requirements Analysis Document and finalized in the System Training Plan. Approximately eight manuals are anticipated. Each manual shall include a statement of NASA flight controller job-oriented training objectives, illustrated self-teaching materials appropriate to the requirements, and lesson objective evaluators (quizzes) to measure achievement with reference to objectives. More specific definition of contents will be included in the Systems Training Plan. Manuals will be formal documents in accordance with the System Training Plan. Each manual shall be revised approximately four times during the Space Shuttle Program. Revisions will include changes for purposes of both configuration updating and training quality improvement. It is anticipated that most or all revisions will entail a reissue of the entire manual.</p>	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFO ONLY UPON REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
<u>Configuration Baseline (CBI)</u>					
3CB-1	KSC Station Set Specification	KX	KSC	<p>The KSC Station Set Specification shall contain the facility requirements matrix by stations, SE (GSE) end item requirements matrix (Requirements for end item/station, end item/responsibility allocation, and abbreviated item description (AID) sheets), facility and SE layout drawings (as built), and functional system block diagrams.</p> <p>The following shall be included by reference:</p> <ol style="list-style-type: none"> Level II & III ICS's Functional system schematics CEI type specifications Detailed design and construction drawings Acceptance test procedures 	Vol. IX, para (TBD)
3CB-2	ICD Cross Reference Index	JM	EPO	<p>Each design activity/contractor shall maintain an ICD cross reference index. The index shall consist of a list of engineering drawings cross referenced to affected ICD's. Only engineering drawings which describe interface requirements and which if changed could cause a change to the requirements specified in an ICD shall be cross referenced. This will allow the designer to determine if and which ICD's may be affected by a proposed change to engineering drawings.</p>	Vol. IV para 5.1
<u>Engineering (EN)</u>					
3EN-1 3EN-2	(Reserved) GSE Measurements List	J,M,KX	KSC	<p>This document shall contain the GSE portion of the master measurement list. It shall contain the identification and characteristics by subsystem of all measurement and control parameters, which must be reviewed or handled by the ground checkout or data storage or retrieval system. Included are time-phased input requirements from the vehicle, GSE, and facility, which will be used to size and program the software and hardware system and instrumentation. Accuracy tolerances will be defined. These data shall be further categorized for each operation to be performed from manufacturing, major test, horizontal flight, vertical flight, and maintenance.</p>	Table 7-II; item 1EN-1 Vol. IX, para (TBD)

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TABLE 7-III.- DOCUMENTS SUBMITTED TO SSFC FOR INFORMATION - CONCLUDED

Number	Title	Source	CFR	Description/Comments	Reference
				<p>c. Training program: A description of curriculum, schedules, and calendar-phased student loads needed to satisfy training requirements</p> <p>The document shall be published only once during the Space Shuttle Program and shall not be subject to revision thereafter. The analysis document shall be used as the basis for preparing the Space Shuttle System Training Plan.</p>	
2TB-2	System Programmed Instruction Manuals	RX	CD	<p>System topic structure for identification of manuals will be initially defined in the Systems Training Requirements Analysis Document and finalized in the System Training Plan. Approximately eight manuals are anticipated. Each manual shall include a statement of NASA flight controller job-oriented training objectives, illustrated self-teaching materials appropriate to the requirements, and lesson objective evaluators (quizzes) to measure achievement with reference to objectives. More specific definition of contents will be included in the Systems Training Plan. Manuals will be formal documents in accordance with the System Training Plan. Each manual shall be revised approximately four times during the Space Shuttle Program. Revisions will include changes for purposes of both configuration updating and training quality improvement. It is anticipated that most or all revisions will entail a reissue of the entire manual.</p>	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFO ONLY UPON REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
<u>Configuration Baseline (CB)</u>					
3CB-1	KSC Station Set Specification	KX	KSC	<p>The KSC Station Set Specification shall contain the facility requirements matrix by stations, SE (GSE) end item requirements matrix (Requirements for end item/static, end item/responsibility allocation, and abbreviated item description (AID) sheets), facility and SE layout drawings (as built), and functional system block diagrams.</p> <p>The following shall be included by reference:</p> <ul style="list-style-type: none"> a. Level II & III ICS's b. Functional system schematics c. CEI type specifications d. Detailed design and construction drawings e. Acceptance test procedures 	Vol. IX, para (TED)
<u>Engineering (EN)</u>					
3EN-1 3EN-2	(Reserved) GSE Measure- ments List	J,M,KX	KSC	<p>This document shall contain the GSE portion of the master measurement list. It shall contain the identification and characteristics by subsystem of all measurement and control parameters, which must be reviewed or handled by the ground checkout or data storage or retrieval system. Included are time-phased input requirements from the vehicle, GSE, and facility, which will be used to size and program the software and hardware system and instrumentation. Accuracy tolerances will be defined. These data shall be further categorized for each operation to be performed from manufacturing, major test, horizontal flight, vertical flight, and maintenance.</p>	Table 7-II; item 1EN-1 Vol. IX, para (TED)
3EN-3	Analyses/Eval- uations/Studies	R,S,J,M,K	EPO	<p>Each design activity shall document the results of analyses/studies/evaluations to define requirements and definition of the Shuttle System. The design activity shall prepare technical data that describe the studies, analyses, and results of their effort. The individual data shall cover such technical specialties as test analyses, stress analyses, life science studies, ground operational support system studies, reliability analyses, and</p>	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSPO ONLY UPON REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
3EN-3	Analyses/Evaluations/Studies	R,S,J,M,K	EPO	Each design activity shall document the results of analyses/studies/evaluations to define requirements and definition of the Shuttle System. The design activity shall prepare technical data that describe the studies, analyses, and results of their effort. The individual data shall cover such technical specialties as test analyses, stress analyses, life science studies, ground operational support system studies, reliability analyses, and	Vol. (TBD)

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TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC ONLY UPON REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				other studies and analyses performed that define the requirements and preliminary design of the Shuttle system. The primary purpose of this information requirements is to assure that study results are recorded, retained, and retrievable as required.	
				<u>Management (MA)</u>	
3MA-1	Photography	J,M,K	EPO	This requirement provides the Program Office with documentary and engineering photography and data as necessary to demonstrate major program events and technical activities. Each EPO shall establish suitable controls to assure a cost-effective photographic effort.	Vol. (TBD)
3MA-2	Documentation Tree	SX,J,M,K	EPO	Each program element shall prepare a documentation tree that shows the organization and logic for documents to be developed within the scope of the Level II program requirements. These documentation trees shall continue the basic philosophy of appendix E to this volume (TBD).	Vol. V, para 6.C
3MA-3	GFE Element Procurement Package Data	R	EPC	For use by NASA in formulating procurement packages to develop and deliver the planned external tank, solid rocket booster, airbreathing engines, and other GFE elements as directed by the NASA. The system integration contractor, as part of the system engineering and integration task, shall define and develop requirement data, ICF's, and related information. The information shall be prepared for the external tanks, solid rocket booster, and airbreathing engines. Specific content requirements for the GFE procurement-related data shall be determined by the NASA in conjunction with the system integration contractor. The packages shall describe technical requirements including performance, interfaces, safety, verification reliability, quality, maintainability, etc., as required. They shall further describe other program requirements such as information requirements, performance management procedures, schedules, configuration control, and other management procedures pertinent to the program element. The latter information shall be included to assure that management techniques employed on GFE contracts are compatible and to facilitate overall program visibility by the NASA.	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC CNRY UFGN REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OFF</u>	<u>Description/Comments</u>	<u>Reference</u>
				The System Integrator Contractor role in this data preparation is to be a supporting role to the Project Office in RFP preparation.	
				<u>Manufacturing/Test (MT)</u>	
3MT-1	Facility Activation/Deactivation Plans	J,M,K	EPC	<p>This activation plan shall perform the following functions.</p> <ul style="list-style-type: none"> a. Identification of the facilities to be available for conduct of the Shuttle Program and definition of any modifications required to an existing facility b. Definition of the responsibilities of the contractor, associate contractors, and the NASA in the various areas of site activation <ul style="list-style-type: none"> 1. Facility design and review 2. Construction monitoring 3. GSE locations 4. Interface controls 5. Verification - facility 6. Site verification 7. Schedule and control c. Overall schedules for accomplishment of individual site activation d. Description of the documentation system to be used in stating requirements, procedures, and status 	Vol. IX, para (IBD)
3MT-2	Test Reports	J,M,K	EPO	<p>These reports shall consist of information and data acquired during the conduct of major ground and flight test programs. The test reports shall contain, as a minimum, the following information.</p> <ul style="list-style-type: none"> a. Test conditions b. Objectives/considerations c. Test site location d. Problems encountered and corrective action e. Test article identification f. Test conductor g. Propellant and pressurants usage (if applicable) h. Test delays and causes 	MVP Vol. I, Table 4.2-1

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC ONLY UPCN REQUEST - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				<ul style="list-style-type: none"> i. Meteorological data j. Summary of test article subsystem performance k. Pertinent recorded test data/logs l. Test number m. Test duration (if applicable) 	
3MT-3	Certification Requirements	J,M	EPO	<p>This document shall define the certification requirements applicable to each item of subsystem hardware to certify its design.</p> <p>The certification requirement shall include the following:</p> <ul style="list-style-type: none"> a. Part numbers, names, and effectivity b. Test part number, serial number, test request number and certification requirement number c. Certification method (test, analysis) d. Specimen size and allocation to tests e. Other P/N certified by this test/analysis f. Configuration differences between test part and production part g. Hardware location on orbiter (station number) h. Type of test (design proof, mission simulation, etc.) i. Sequence and environments of tests j. Test durations k. Pass/fail criteria and tolerances l. Operational mode of equipment during test (on/off) 	MVP Vol. I, Table 4.2-1
3MT-4	Qualification Site Approval	J,M	EPO	<p>The QSA is utilized for approval at the test site prior to test teardown and formal report preparation and submittal. Utilized for high cost or sophisticated certification tests, where test is constraining other program milestones and otherwise required by proper authority.</p> <p>The qualification site approval provides a review of test results for confidence that results are acceptable prior to test setup teardown (no repeat testing is required). It shall include:</p> <ul style="list-style-type: none"> a. Test hardware identification. b. Certification Requirement No. c. Test agency identify. d. Test hardware configuration. e. Sequence and environments of test. f. Verification of calibration, adjustment and proper operation of test facilities or instruments. 	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC CNIY UPCN REQUEST - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				<ul style="list-style-type: none"> g. Test evaluation. h. Test hardware performance (key parametric results). i. Failure and anomaly evaluation. j. Certification recommendation. k. Approval signatures. 	
3MT-5	Certification Test Request	J,M	EPO	<p>The Certification Test Request is the document authorizing any test activity at a contractor's facility. It provides the authority and direction for utilization of facilities, manpower, hardware, procedure/preparation and schedule implementation of testing.</p> <p>The certification test request shall contain the following:</p> <ul style="list-style-type: none"> a. Complete statement of test objectives. b. Test sequence and suggested procedure. c. Requirements for test. d. Instrumentation requirements including range and accuracy. e. Data acquisition requirements, conditions and frequency. f. Data reduction requirements, method and form. g. Drawings as required for set-up and instrumentation. h. Report requirements. i. Photographic requirements. 	Vol. (TBD)
3MT-6	Test Agency Report	J,M	EPO	<p>The test agency report is the formal report for all test information and is prepared by the test agency. It covers all test information as to objectives, methods, facilities, test set-up and test data including performance or failures for the item under test. It shall include the following:</p> <ul style="list-style-type: none"> a. Test objective. (reference the Certification Requirement if appropriate.) b. Test hardware description. c. Test set-up description including photographs and drawings. d. Test procedure as run with validation. e. Failure, deviation and anomaly details. f. Test results and data. g. Laboratory notes with validation. 	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFO ONLY UPON REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
3MT-7	Test Start Approval	J,M	EPO	<p>The test start approval is a signed checklist to assure that a test facility is adequate and prepared to conduct a certification test on major sophisticated or high cost items. It shall contain as a minimum the following:</p> <ol style="list-style-type: none"> a. Part name, number, subsystem and CR number. b. Test agency and site location. c. Requirements - approved and/or available. <ol style="list-style-type: none"> 1. Acceptance test procedure. 2. Certification/Qualification test plan/procedures. 3. Drawing and specification. 4. Test hardware configuration. 5. Test facility certified. 6. Quality assurance available. 7. Development test results approved. 8. Measurement devices calibrated and a suitable accuracy. 	Vol. (TBD)
3MT-8	Quick Look Report	J,M	EPO	<p>The quick look report provides test information on a preliminary basis for early confidence to interested parties. It is an informal report of test completion and results and anomaly information. Its contents normally include the following:</p> <ol style="list-style-type: none"> a. Test objective. b. Test hardware description. c. Test setup. d. Test procedure used. e. Failures, deviations and anomaly details. f. Preliminary test results. g. Conclusion - will final test results satisfy objectives? 	Vol. (TBD)
3MT-9	Engineering Analysis Report	J,M	EPO	<p>The engineering analysis report provides all details of an analysis for certification or an explanation for clarity of an anomaly occurring during testing or to amplify a test result conclusion.</p> <p>The report should be prepared by the responsible design engineering unit and contain the following:</p> <ol style="list-style-type: none"> a. Certification requirements definition. 	Vol. (TBD)

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC ONLY UPON REQUEST - CONTINUED

Number	Title	Source	CFR	Description/Comments	Reference
				<ul style="list-style-type: none"> b. Test/analysis objectives. c. Certification analysis logic and details. d. Test results summary and explanation. e. Identification of hardware experiencing anomalies. f. Failure resolution and test anomaly explanation. g. Test analysis conclusion and results. h. Formal certification recommendations. 	
3MT-10	Certification Approval Request	J,M	EFO	<p>The certification approval request is an internal approval sheet for certification test and analysis results. It is also used to request NASA approval of all certification tests and analysis and their supporting documentation. It should include the following:</p> <ul style="list-style-type: none"> a. Certification Requirement Number b. Part number and name c. Supplier part number d. Subsystem e. Test agency and location f. Test start and completion dates g. Test procedure number and date h. Test/analysis report number and date i. Engineering Analysis Report (EAR) number and date (if required) <p>The CAR shall assure the following:</p> <ul style="list-style-type: none"> a. Test procedure was complied with b. Constraints noted are removed c. Any failures corrected or dispositioned d. Test/analysis data satisfies requirements e. Test witnessing was as required f. Test/analysis report is acceptable and attached 	Vol. (TBD)
3MT-11	Certified Hardware List	J,M	EFO	<p>The certified hardware list is a listing by subsystem and part number of all certification level hardware which has been certified by the contractor and approved by the NASA for flight. It is used at FFR to certify flight readiness.</p> <p>The certified hardware list documents the fully certified hardware at any point in the program. It is developed from the subsystem certification index (Subsystem Certification Plan) as</p>	MVP Vol. I para 2.3

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC ONLY UPON REQUEST - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				certification is completed and approved. It should include the following:	
				a. Item part number. b. Item nomenclature. c. Item certification requirement (CR) numbers. d. Subsystem involved. e. Certification method. f. Certification effectivity. g. Certification report reference.	
3MT-12	Subsystem Certification Plans	J,M,K	EPO	<p>These plans provide for documentation of all subsystem level certification requirements, including method of resolution (analysis, test, and etc.), to permit internal coordination and approval prior to implementation. This family of plans identifies all vehicle subsystem and ground support equipment certification requirements. The plans describe the method for satisfaction of each requirement for certification of design and hardware adequacy at progressive milestones (i.e., first horizontal flight, first vertical flight, first manned orbital flight, and other significant events as appropriate).</p> <p>a. The first section of each plan shall list the subsystem and major assembly level certification requirements corresponding to the design and performance specified in the respective subsystem requirements handbook. For each requirement, the certification method will be identified (analysis or test) and a description provided as to the degree each contributes to satisfaction of the requirement. The type of testing to be performed at each level and the type of data to be obtained will be specified along with a brief description of any analysis required. The key events or milestones that are constrained by each requirement will be identified. The document(s) that provide a detailed definition of the implementation plan will also be referenced.</p> <p>b. The second section of each plan shall contain a matrix of all subsystems components or GSE and item certification and identify the certification method for each type of performance and environment requirements.</p>	MVP Vol. I, Table 4.2-1

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFC ONLY UPON REQUEST - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				For certification tests, the number of specimens, test type, test rigor and quality assurance requirements will be summarized. The extent of any analysis or simulation required will also be described, identifying data sources, analytical techniques and the type of results to be provided. Where appropriate, reference will be made to documentation that further details the method of implementation.	
				<u>Safety, Reliability, and Quality (S)</u>	
3SR-1	EEE Parts Specification	J,M,K	EPO	Each EEE part shall be controlled by a specification (or combination of specifications) that delineate as a minimum: complete identification of the part; physical, environmental, and performance requirements; reliability requirements including inspections and tests for qualification, acceptance, and lot sampling where required; explicit requirements to be satisfied in accepting parts for use in the contract hardware including 100 percent screen and burn-in; packaging, storage, and handling requirements; traceability requirements; and data retention and submittal requirements.	NHB 5300.4(1D) ID301, para 8.c
3SR-2	Nonconformance Reporting	J,M,K	EPO	Paragraph 1E506 of Reference contains information on this type of reporting.	NHB 5300.4(1D) ID506, para 2
3SR-3	Contractor Workmanship Standards	J,M,K	EPC	Where workmanship standards are necessary, they shall be based upon related process specification requirements (Electrical Assembly, Fabrication Processes, Structures, Ref. Info.). The standards shall contain appropriate product acceptance/rejection criteria in visual form.	NHB 5300.4(1D) ID504, para 5
3SR-4	Acceptance Data Package	J,M,K	EPC	Acceptance data/information packages (ADP) shall be submitted for each deliverable end item including support equipment. The system used for compilation, storage, and display of the acceptance data shall make maximum use of automated data storage systems such as computer storage, microfilm, etc., to support NASA acceptance and minimize the amount of hard-copy data to be shipped with the hardware. Specific requirements relative to which data must be displayed for acceptance and which data must accompany the hardware at shipment shall be	NHB 5300.4(1D) ID505, para 6 Table 7-XVIII

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSEC ONLY UPON REQUEST - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				coordinated with NASA, JSC, and the System Contractor for final resolution. Specific data requirements are shown in Table 7-XVIII.	
3SR-5	EEE Part Application Analysis Report	J,K,M	EPO	<p>These data shall document the results of EEE parts application and stress analysis reviews conducted prior to design release for black boxes as follows.</p> <ul style="list-style-type: none"> a. Determination of electrical, thermal, and mechanical stresses experienced by parts in their equipment application and verification of compliance with derating requirements b. Consideration of functional adequacy and possible sensitivity of parts to specific applications 	NHB 5300.4(1D)
3SR-6	(Reserved)				
3SR-7	Limited Life Status Reports	J,M,K	KSC	<p>The data shall provide status in the following areas.</p> <ul style="list-style-type: none"> a. Defining those limited shelf-life items installed in vehicles having a compliance due within 90 calendar days b. Those items that have not had compliance accomplished c. Alphanumeric listing including serial number of all limited shelf-life items in the program and those life limits including next compliance due d. Status of limited-life items installed or vehicle-by-vehicle number on request to support readiness review 	
3SR-8	Pressure Vessel Historical Data	J,M,K	EPO	The documentation shall be provided for flight or flight-type pressure vessels and pressure vessels installed in associated ground support equipment that interfaces with flight hardware. Information to be included is described in Table 7-XIX.	NHB 5300.4(1D) ID505, para 6 Table 7-XIX
3SR-9	(Reserved)				
3SR-10	(Reserved)				

TABLE 7-IV.- DOCUMENTS SUBMITTED TO SSFO CNIY UECN REQUEST - CONCLUDED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
3SR-11	Sampling Procedures	J,M,K	EPO	Sampling plans, other than those contained in the existing military document, may be utilized by the contractor after approval of NASA or its designated Government quality representative. Nonmilitary acceptance sampling procedures to be employed in the inspection of Shuttle hardware will be submitted for approval 10 days prior to implementation. The procedures shall contain justification and rationale, identification of types of parts to be sampled, method and criteria for determining characteristics of hardware to be verified, method of maintaining historical data relative to sampling results, methods for assuring randomness in selection of samples, criteria to be used in determining need for change to plan (reduced, normal, tightened).	NHB 5300.4(1D) ID 510, para 1
2SR-12	List of Critical Processes	J,M,K	EPO	(TBD)	NHB 5300.4(1D) para (TBD)

TABLE /-V.- LIST OF SPACE SHUTTLE LEVEL II
PROGRAM DEFINITION AND REQUIREMENTS VOLUMES (1NA-1)

<u>Volume</u>	<u>Title</u>	<u>OPR</u>
I	Program Description and Requirements Baseline	LV
II	Program Structure and Responsibilities	LV
III	Program Planning and Analysis	LV
IV	Configuration Management	LV
V	Information Management	LV
VI	GPE Management	LV
VII	Reserved	
VIII	Mission Operations	LF
IX	Ground Operations	LG
X	Flight and Ground System Specification	LF
XI	Crew Operations	LF
XII	Integrated Logistics	LG
XIII	Reserved	
XIV	Payload Accommodations	LP
XV	Resource Management Policy and Requirements	LR
XVI	Cost per Flight Parameters Control Document	IR
XVII	Reserved	
XVIII	Software	FA

Note: See JSC07700, Vol. I for brief descriptions of each Volume.

TABLE 7-VI.- LIST OF REQUIREMENTS/DEFINITION DOCUMENTS (2EN-6)

Book	Title
1	STRUCTURES Fuselage Structure Crew Module Wings Vertical Stabilizer TPS External Insulation TPS Leading Edge TPS Internal Insulation
2	MECHANICAL SYSTEMS Landing System Deceleration System Docking Mechanism Separation Mechanism Actuation Mechanism Payload Retention and Deployment
3	PROPULSION Main Propulsion Reaction Control Orbital Maneuver Propulsion Airbreathing Propulsion
4	POWER Electrical Power Hydraulics Auxiliary Power Unit Ordnance
5	AVIONICS Guidance, Navigation, and Control Communication and Tracking Displays and Controls Instrumentation Data Process and Software Electrical Power Distribution and Control Computers Shuttle Avionics Integration Lab
6	ENVIRONMENTAL CONTROL AND LIFE SUPPORT Atmospheric Revitalization Life Support Thermal Control (Continued)

TABLE 7-V.- LIST OF SPACE SHUTTLE LEVEL II
PROGRAM DEFINITION AND REQUIREMENTS VOLUMES (1MA-1)

<u>Volume</u>	<u>Title</u>	<u>CFR</u>
I	Program Description and Requirements Baseline	IV
II	Detail Program Interrelationships	IV
III	Program Analysis and Planning	IV
IV	Configuration Management	IV
V	Information Management	IV
VI	GFE Management	IV
VII	Procurement Management	IV
VIII	Mission Operations	IF
IX	Ground Operations	IG
X	Flight and Ground System Specification	IF
XI	Crew Operations	IF
XII	Integrated Logistics	IG
XIII	Reserved	
XIV	Payload Accommodations	IF
XV	Resource Management Policy and Requirements	IF
XVI	Cost per Flight Parameters Control Document	IF
XVII	Program Management Manual	IV
XVIII	Software	FA

Note: See JSC07700, Vol. I for brief descriptions of each Volume.

TABLE 7-VI.- LIST OF REQUIREMENTS/DEFINITION DOCUMENTS (2FN-6)

Book	Title
1	STRUCTURES Fuselage Structure Crew Module Wings Vertical Stabilizer TPS External Insulation TPS Leading Edge TPS Internal Insulation
2	MECHANICAL SYSTEMS Landing System Deceleration System Docking Mechanism Separation Mechanism Actuation Mechanism Payload Retention and Deployment
3	PROPULSION Main Propulsion Reaction Control Orbital Maneuver Propulsion Airbreathing Propulsion
4	POWER Electrical Power Hydraulics Auxiliary Power Unit Ordnance
5	AVIONICS Guidance, Navigation, and Control Communication and Tracking Displays and Controls Instrumentation Data Process and Software Electrical Power Distribution and Control Computers Shuttle Avionics Integration Lab
6	ENVIRONMENTAL CONTROL AND LIFE SUPPORT Atmospheric Revitalization Life Support Thermal Control

(continued)

TABLE 7-VI.- LIST OF REQUIREMENTS/DEFINITION

DOCUMENTS (2EN-6) - CONCLUDED

<u>Book</u>	<u>Title</u>
7	CREW STATION AND EQUIPMENT Cabin Arrangement Crew Provisions and Accommodations
8	SOLID ROCKET BOOSTER
9	EXTERNAL TANK
10	GROUND SUPPORT EQUIPMENT Manufacturing Support GSE Major Ground Test GSE Flight Test GSE Ground Software
11	FACILITIES Mfg. Supt. Facility Major Ground Testing Facility Flight Testing Facility Prod. Operations Facility
12	MAJOR GROUND TEST Main Propulsion Thermal Vacuum Vibroacoustic Hydraulic Flight Control Ground Vibration
13	MCCRUPS
14	TRAINERS
15	FLIGHT TEST REQUIREMENTS
16	PAYLOAD ACCOMMODATIONS

TABLE 7-VII.- TYPICAL OUTLINE FOR
REQUIREMENTS/DEFINITION DOCUMENTS (2EN-6)

- 1.0 SCOPE
- 2.0 APPLICABLE DOCUMENTS
- 3.0 REQUIREMENTS
 - 3.1 GENERAL
(This section common to all books will reference system specifications and CEI for General Requirements.)
 - 3.2 AVIONICS REQUIREMENTS
 - 3.2.1 Performance Requirements
 - 3.2.2 Design Requirements
 - 3.2.3 Interface Requirements (if applicable)
(This section contains requirements which are common to avionics as a generic category; e.g., Radiation Survivability Capability.)
 - ABOVE INFORMATION ACCUMULATED AT AVIONICS BOOK LEVEL
 - Volume 1 Guidance, Navigation, and Control
 - Volume 2 Communications and Tracking
 - Volume 3 Displays and Controls
 - Volume 4 Instrumentation
 - Volume 5 Data Processing and Software
 - Volume 6 Electrical Power Distribution and Control
 - Volume 7 Computers
 - Volume 8 System Integration Laboratory
 - 3.3 SUBSYSTEM REQUIREMENTS
 - 3.3.1 Performance Requirements (Functional at Mission Phase)
 - 3.3.2 Design Requirements (Physical by "illities")
 - 3.3.3 Ground Support Requirements
 - 3.3.4 Interface Requirements
- 4.0 VERIFICATION REQUIREMENTS
 - 4.1 DEVELOPMENT PLAN FOR
 - 4.2 CERTIFICATION REQUIREMENTS
 - 4.3 ACCEPTANCE AND CHECKOUT REQUIREMENTS

(continued)

TABLE 7-VII.- TYPICAL OUTLINE FOR
REQUIREMENTS/DEFINITION DOCUMENTS (2EN-6) - CONCLUDED

- 5.0 SUBSYSTEM DEFINITION
(This section is a summary baseline definition which provides road map to drawings Proc. Spec/Systems schematic/process specs, etc.)
 - 5.1 SUBSYSTEM DESCRIPTION
 - 5.2 SUBSYSTEM PERFORMANCE AND CHARACTERISTICS
 - 5.3 SUBSYSTEM INTERFACES

(ABOVE INFORMATION ACCUMULATED AT SUBSYSTEM
VOLUME LEVEL.)

TABLE 7-VIII.- REQUIRED ELEMENTS FOR
IMMEDIATE PROBLEM REPORTS (2PA-1)

<u>Number</u>	<u>Contents</u>
1	Date of occurrence
2	Location of article at time of occurrence
3	Test or operation being performed at time of occurrence
4	Prevalent conditions at time of occurrence
5	Nonconforming article: part number, part name, serial number
6	Contractor deliverable item description
7	Indication of whether nonconformance is a failure or unsatisfactory condition
8	Symptom of nonconformance
9	Brief narrative description of nonconformance, including comparison of expected events with actual events (or results)
10	Criticality with relationship to mission effects
11	Cause of nonconformance, if known
12	Contract number
13	Test document number
14	Subsystem affected

TABLE 7-IX.- REQUIRED ELEMENTS FOR
SUBSEQUENT PROBLEM REPORTS (2PA-1)

<u>Number</u>	<u>Contents</u>
1	Uniquely identifiable report number
2	Date of occurrence
3	Location of article at time of occurrence
4	Test or operation being performed at time of occurrence
5	Prevalent conditions at time of occurrence
6	Nonconforming article: part number, part name, serial number, manufacturer, next higher assembly part number
7	Next higher assembly: part number, serial number, manufacturer
8	Contractor deliverable item description
9	Indication of whether nonconformance is a failure or unsatisfactory condition
10	Symptom of nonconformance
11	Brief narrative description of nonconformance, including comparison of expected events with actual events (or results)
12	Criticality of nonconformance with relationship to mission effects
13	Indication of whether problem is due to design deficiency or manufacturing inconsistency
14	Contract number
15	Test document number
16	Time cycle in use
17	Subsystem affected
18	Planned date of dispositioning
19	All end items that may be affected by the problem

TABLE 7-X.- ELEMENTS OF OPEN PROBLEMS LIST (2PA-2)

<u>Number</u>	<u>Contents</u>
1	Problem Action Center (PAC) number
2	Date of occurrence or detection of nonconformance
3	Indication of whether nonconformance classified as failure or unsatisfactory condition
4	Part number on which nonconformance occurred
5	Part name on which nonconformance occurred
6	Serial number of part on which nonconformance occurred
7	Manufacturer of part on which nonconformance occurred
8	Symptom of nonconformance
9	Test being performed at time of occurrence
10	Brief narrative description of nonconformance
11	End item on which nonconformance occurred, if applicable
12	Prevalent conditions at time of nonconformance
13	All end items that may be affected by nonconformance
14	Problem report numbers and dates that relate to the same problem, as available
15	Criticality of nonconformance
16	Indication of whether nonconformance is design or manufacturing oriented, as available
17	Analysis results, including laboratory test results, as available
18	Cause of nonconformance, as available
19	Corrective action, as available
20	Estimated closeout date
21	Date problem is closed

TABLE 7-XI.- ELEMENTS OF PROBLEM CICSECUT
AND EXPLANATIONS REPORT (2PA-3)

<u>Number</u>	<u>Contents</u>
1	Uniquely identifiable report number
2	Date of occurrence
3	Location of article at time of occurrence
4	Test or operation being performed at time of occurrence
5	Prevalent conditions at time of occurrence
6	Nonconforming article: part number, part name, serial number, manufacturer, next higher assembly part number
7	Next higher assembly: part name, serial number, manufacturer
8	Contractor deliverable and end item description
9	Indication of whether nonconformance is a failure or unsatisfactory condition
10	Symptom of nonconformance
11	Brief narrative description of nonconformance, including comparison of expected events with actual events (or results)
12	Criticality of nonconformance with relationship to mission effects
13	Indication of whether problem is due to design deficiency or manufacturing inconsistency
14	Results of analysis, including laboratory tests
15	Corrective action that has been established (closeout), including reference to released documentation establishing this corrective action
16	Efforts made to determine nonconformance cause (explanation)
17	Cause of nonconformance (closeout)
18	Contract number
19	Test document number
20	Time cycles in use
21	Subsystem affected
22	Date of dispositioning
23	Problem report numbers, and dates, that relate to the same problem
24	Previous history of nonconforming article
25	Explanation rationale (explanation)
26	Assurance that explanations using redundancy and/or alternate modes of operation as one of the elements do not negate each other (explanation)

(continued)

TABLE 7-XI.- ELEMENTS OF PROBLEM CLOSEOUT
AND EXPLANATIONS REPORT (2PA-3) - CONCLUDED

<u>Number</u>	<u>Contents</u>
27	Date when last test of article, prior to mission, is to be performed; statement as to whether or not nonconformance is detectable during mission (explanation)
28	Effect on mission if nonconformance recurred and recommended operational work-around procedures (explanation)
29	Vehicle effectivity of problem closeout/explanation

TABLE 7-XII.- ELEMENTS OF FAILURE MODE AND
EFFECT ANALYSIS REPORT (2SR-4)

<u>Number</u>	<u>Contents</u>
1	System/subsystem assembly/item - Identification of item for which the FMEA is being conducted to the level of its identity
2	Prepared/approved by - Identification of analyst who performed the FMEA and individuals responsible for overall FMEA effort
3	Page/date/superseded - Pages numbered and dated individually; each page indicating total numbered pages per item, superseded page dates indicated
4	Item identification - Name, identification number, drawing number by which the contractor identifies and describes each component or module. Drawing Reference Designation: Identification of the component or module on the schematic. Quantity: Total number of items in the subsystem.
5	System logic diagram number (if applicable) - Identification number of FMEA system logic block diagram and of the function
6	Function - Concise statement of the function performed
7	Failure mode and cause - Identification of the specific failure mode after considering the four basic failure conditions. <ul style="list-style-type: none"> (1) Premature operation (2) Failure to operate at a prescribed time (3) Failure to cease operation at a prescribed time (4) Failure during operation <p>For each applicable failure mode, the major cause(s) including operational and environmental stress factors described, if known</p>
8	Mission phase - Phase of mission in which failure occurs, e.g., Prelaunch: checkout, countdown; Flight: boost phase, earth orbit, etc.
9	Failure effect on - Subsystem, interfacing subsystem (i.e., system), mission/crew, element and/or vehicle as required.
10	Failure detection method - A description of the methods by which the failure could be detected
11	Correcting action - An identification of correcting

(continued)

TABLE 7-XII.- ELEMENTS OF FAILURE MODE AND
EFFECT ANALYSIS REPORT (2SR-4) - CONCLUDED

<u>Number</u>	<u>Contents</u>
	action, automatic or manual, which could be taken to circumvent the failure. Include statement of alternate means of operations and redundancy available after failure.
12	<p>Failure mode criticality category designation - Categorization of failure mode criticality in relation to crew safety and mission effect</p> <p>Criticality 2 or 3 equipment shall be further evaluated in accordance with the redundancy hardware screens described below. A notation will be made identifying each screen the hardware does not pass.</p> <ol style="list-style-type: none"> (1) The redundant elements are not capable of checkout during the normal mission turn-around sequence (2) Loss of a redundant element is not readily detectable by the flight crew (3) All redundant elements can be lost by a single credible cause or event such as contamination or explosion.
13	Revision - A notation shall be made opposite each entry that has been changed since the previous submittal.
14	Time frame - Time required to make corrective action and time available to be included.
15	Ground rules and assumptions - Statement of all ground rules and assumptions followed during the performance of FMEA.
16	Remarks/Hazards - Statements of any remarks, recommendations, and potential hazards as required.

TABLE 7-XIII.- ELEMENTS OF CRITICAL ITEMS LIST (CIL) (2SR-8)

<u>Number</u>	<u>Contents</u>
1	System/subsystem/assembly/item - Identifies the item on the CIL. Include on the CIL all criticality 1, 2, and 3-Sub-I items.
2	Criticality category - Identifies the criticality category of entries considered on the CIL. The entries should be grouped into criticality categories 1, 2, and 3-Sub-I items.
3	FMEA reference - Entries should be referenced to the FMEA from which they were derived.
4	Prepared by/approved - Identifies the analyst preparing the CIL and the appropriate individuals responsible for the overall FMEA/CIL effort.
5	Data/superseding - The date on which each page is approved should be entered. If the page being submitted supersedes a previously submitted page, the date of the previous page should be entered on the superseding line. If there has been no previous submission, "None" should be entered.
6	Item identification - Identifies the item name and item number with the entry.
7	Failure mode and cause - Identifies the failure mode and major cause(s) associated with the entry.
8	Failure effect - Identifies the specific effects associated with the entry. The effect statement should specify the safety and mission success consequences.
9	Rationale for acceptability - Identifies the rationale or justification for retaining the critical item where no rationale or justification is given, corrective action(s) for eliminating the critical item shall be given.
10	Redundancy hardware screens - Indicates each redundancy screening criteria which the redundant item fails as described in item 1 of the FMEA. If the item passed all redundancy screening criteria, indicate the criticality.
11	Corrective action/retention classification - The critical item should be classified as follows: <ul style="list-style-type: none"> A1. Item for which design action is recommended. A2. Item for which additional in-flight and ground procedures (operational, test, and manufacturing) are recommended.

(continued)

TABLE 7-XIII.- ELEMENTS OF CRITICAL ITEMS

LIST (CIL) (2SR-8) - CONCLUDED

<u>Number</u>	<u>Contents</u>
	<p>B. Item for which analysis and test results support acceptability and adequate procedures exist to minimize the effect of occurrence or eliminate problem.</p> <p>C. Item involving passive equipment characteristics. Adequate safety margins exist and test results prove acceptability.</p>
12	Critical item identification - indicates the total number of critical items resulting from use of the item (i.e., same part number) in the design.
13	Revision - An identifier should be placed in the revision block opposite each entry that has been changed since the previous submittal.
14	Total critical items - Include the total number of critical items by criticality. The summation shall be performed in a manner such that one item shall be counted uniquely.

TABLE 7-XIV.- ELEMENTS OF REQUEST, SUBSTITUTIONS
AND DEVIATIONS, EEE PARTS REPORT (2SR-11)

<u>Number</u>	<u>Contents</u>
1	Equipment name, function and criticality, component number and serial number, supplier/subcontractor and effectivity.
2	Subassembly name, number, and criticality.
3	Part name, type and common designation (closest commercial equivalent), specification number and part manufacturer of the parts contained in the as-designed equipment.
4	Deviated or substitute part number, part manufacturer and specification number, part name, part type, common designation (closest commercial equivalent).
5	Salient differences including SCD reliability and quality requirements and screening and turn-in between design baseline and deviated or substitute parts.
6	Qualification status and basis of qualification of deviated or substitute part.
7	Limited life (yes, no).
8	Justification for deviation or substitution including technical adequacy of deviated or substitute part. Where a limited life item is affected, the contractor shall ensure that proper changes are made to limited life control lists.

TABLE 7-XV - ELEMENTS OF SAFETY ANALYSIS REPORT (2SR-1)

<u>Number</u>	<u>Contents</u>
1	<p>Hazard Analysis Results including, as applicable: System/subsystem/assembly/item; Reference documentation/drawing; Reference FMEA; Event/Mission Phase; Page/date/revision; Prepared/approved by. The Hazard Analysis shall consist of:</p> <ul style="list-style-type: none"> a. Hazard Identification including description and cause. b. Hazard Effects on personnel and equipment, including mission/event/activity effects and response time available. c. Hazard level d. Hazard Control Actions, including preventive measures considered and corrective action(s) selected (Hazard Reduction Precedence Sequence); remedial measures considered; risk assessment, and actions required.
2	A record of acceptable and unacceptable risks, including supporting rationale.
3	<p>A Hazard Status summary, consisting of:</p> <ul style="list-style-type: none"> a. <u>HA#</u> - Hazard analysis sheet identification number. b. <u>Hazard Description</u> - Brief narrative description of hazard. c. <u>Initial Hazard Level</u> - The hazard level assigned to the identified hazard prior to applying the HRFS (Hazard Reduction Precedence Sequence) corrective action. Include hazard carried over for tracking from previous phases: <ul style="list-style-type: none"> "CA" - Catastrophic "CR" - Critical "CN" - Controlled d. <u>Reduced Hazard Level</u> - The proposed hazard level to which the hazard may be reduced upon verification/accomplishment of the HRFS corrective action.

(continued)

TABLE 7-XV - ELEMENT OF SAFETY ANALYSIS
REPORT (2SR-1) - Concluded

<u>Number</u>	<u>Contents</u>
e.	<p><u>HRPS Rationale</u> - The HRPS step or combination of steps proposed to eliminate or reduce the hazard:</p> <p>"D" - Design "S" - Safety Device(s) "W" - Warning Device(s) "P" - Procedure(s)</p>
f.	<p><u>Tracking Hazard Level</u> - The hazard level assigned after considering HRPS corrective action.</p> <p>"CA" - Catastrophic. Residual hazard, requires tracking. "CR" - Critical. Residual hazard, requires tracking. "CA/CN", "CR/CN" - Hazard level has been reduced, but HRPS rationale requires study or verification/accomplishment. "CN" - Controlled. Hazard level has been reduced via proven design or verification/accomplishment of HRPS step(s). Design accomplishment must be confirmed at CDR. HRPS accomplishment must be confirmed by successful completion of test programs, analyses, or training programs. "D" - Eliminated. Hazard has been eliminated by design.</p>
g.	<p><u>Remarks</u> - Flag out residual hazards ("CA" or "CR") and recommend resolution. Emphasize those hazards requiring further study, test, or analysis and status of resolution - <u>not started</u>, <u>in work</u>, <u>completed</u>, or <u>NA</u>. Identify hazards recommended to be accepted and reference risk assessment rationale.</p>

List of safety requirements in element and subsystem specifications, including a cross-reference to specification paragraphs.

TABLE 7-XVI - MASS PROPERTIES REPORTING PLAN

I. PURPOSE

The purpose of this plan is to detail the mass property reporting required from each project element and to establish the method and procedures for combining the project element inputs into an integrated mass property reporting system.

II. RESPONSIBILITIES

A. Program Office

Has overall responsibility for providing integrated mass property reporting system.

B. System Contractor

Responsible for preparation of Shuttle Mass Property monthly reports. Assuring that data have been correctly integrated and that Project Offices/element contractors have been supplied necessary data (Rockwell input data) that they require to generate element data.

C. Project Offices

Have responsibility for providing the element mass property data described below. These data shall be provided directly to the system contractor from the element contractors. The Project Offices shall provide liaison personnel (NASA through coordination meetings and element contractors as required through on-site support at system contractor) to the system contractor to assure establishment of consistent reporting techniques and data requirements.

D. Integration Division (Program Operations Office)

Is responsible to the Program Office for the overall NASA coordination and monitoring of the system contractor in the area of mass properties reporting.

III. REPORTING REQUIREMENTS

A. Monthly Weight Reporting

Each major element contractor shall submit the following specific information. Data base tapes are not required until six months after ATF. Tape formats shall be compatible with

(continued)

TABLE 7-XVI - MASS PROPERTIES REPORTING PLAN

requirements as defined in next section.

1. Weight data base shall be submitted monthly and shall be reported to the detailed component level on tape. Identification of individual components by drawing number or functional code plus vehicle effectivity code shall be provided. Changes in component weight from month to month shall be identified and explanation of the change shall be provided. Also, the maturity of all weight reporting shall be identified (i.e., layout, estimated, calculated or actual).

2. Mass Property Data

a. Weight and Center of Gravity - Weight and center of gravity of all components shall be presented to the nearest pound and inch (in all three axes), respectively.

b. Mass Moment and Products of Inertia - The mass moment and products of inertia of all components shall be given to the nearest slug-foot (10^{-6}) squared about three mutually perpendicular axes through the center of gravity.

3. Current potential weight increases or decreases shall be submitted as part of this monthly weight and mass property report. Action being taken by the contractor or action required by NASA in implementing these weight changes should be noted, including the status in regard to implementing these changes.

4. The contractor shall provide sufficient engineering data in the weight and mass property report to define the following. These data need to be updated only if a change has occurred.

a. Drawings and/or sketches which show detailed configurations with sufficient dimensional data to show location of expendable tanks, mechanical systems, interfaces, major station locations, coordinate system, etc.

b. ET and SRE fluid and propellant tank capacities, residuals, depletion sequences, and depletion tables which show incremental mass property variations. Physical characteristics of fluids and propellants shall also be included.

c. Design data utilized for determining weight shall be defined; i.e., sizing criteria, load factors, etc.

(continued)

TABLE 7-XVI - MASS PROPERTIES REPORTING PLAN

5. Summary of critical weight and mass property elements (i.e., c.g. boundaries, slosh models, etc.).

B. Mass Properties History Log

An actual weight log shall be maintained by each element contractor for each major end item. The log shall provide mass properties information applicable to acceptance, delivery, and instructions for subsequent weighing of the vehicle during operations. The log shall consist of:

1. Title Page
2. Table of Contents
3. Actual Weight and Balance Records
4. Record of Items Removed, Added and/or Replaced
5. Basic Weight Check List
7. Tables and Charts
 - a. Weighing Instructions
 - b. Vehicle Diagram
 - c. Compartment or Locker Loading Data
 - d. Center of Gravity Data
 - e. Fluid and Propellant Typical Loading
 - f. Payload Cargo Loading Data

IV. WEIGHT DATA BASE TAPE FORMAT AND REQUIREMENTS

- A. Either 7 or 9 track tapes are acceptable.
- B. All tapes must be clearly labeled. Label must contain:
 1. Vendor's name
 2. Reel/volume identification

(continued)

TABLE 7-XVI - MASS PROPERTIES REPORTING PLAN - CONCLUDED

3. Number of tracks (7 - 9)
4. Recording density, bits/inch
5. Logical record length (blocking factor)
7. Number of files
8. For SL tapes: DSN for each file

C. A letter of transmittal shall be sent separately for each tape. This letter shall clearly describe the data on each volume and file, and shall specifically reference the vendor's reel identification number.

V. SCHEDULE

A. Monthly Weight Reports

Initial submittal due on the 15th of the month following the first full month after ATP. Subsequent submittals are due monthly and are to be delivered to Rockwell International (system contractor) by the 15th of each month such that total Shuttle (Orbiter, ET, SRB) mass properties report can be integrated by the first of the following month.

B. Mass Properties History Log

Initial submittal at delivery. Logs shall be kept updated throughout life of vehicle/hardware.

VI. COORDINATION MEETINGS

NASA (JSC, MSFC, etc.), Rockwell International, and element contractors shall hold periodic meetings to resolve mass property reporting and format issues.

TABLE 7-XVII - INTEGRATED SCHEMATICS

Levels of integrated schematics are as follows:

a. Shuttle subsystem block diagrams. This schematic will depict a gross relationship between the subsystems, elements, and support equipment and will show gross functional interfaces.

b. Vehicle integrated schematics will depict the relationship of the components within the subsystems and their relationship to the components of other subsystems. The level of detail will include black box interface plug and pin detail. In addition to the operational subsystem, the schematics will show grounding and shielding details, provide convenient pictorial representation of controls and displays and include tabular listings necessary to provide access to schematic representation of specific controls, displays, remote commands, and instrumentation response channels.

c. The vehicle and support equipment integrated schematics will depict the relationship between the vehicle subsystems and the support equipment including facility involvement for each station or site. The level of detail and areas of involvement will be the same as in item 2 preceding.

The System Contractor shall also prepare and maintain system level integrated schematics for:

a. Major Ground Test

b. KSC Test and Operations

The System Contractor Integrated Schematics shall include a symbology index to standardize program-wide use of symbols for integrated schematics. Element contractors will prepare and maintain those integrated schematics for the Shuttle elements as considered necessary by the Project officer. Element contractors shall supply the System Contractor with the design data necessary to be included in the system level integrated schematics.

TABLE 7-XVIII - ELEMENTS OF ACCEPTANCE DATA PACKAGE

The following information shall be available for each end item, with the capability to transmit the information with the end item, for non-flight hardware end items and for less complex items; appropriate portions of such data will be included, commensurate with the complexity and end-use of the hardware.

1. Operating Time/Cycle - Information identifying time/cycle sensitive items installed in the end item, the allowable design limitations of each, accumulated operating time/cycles and remaining time/cycles, including required action points such as operation, inspection, or maintenance.

2. Age Sensitive Items - Information identifying each age sensitive item installed in the end item, the design life limitation and expiration date of each.

3. Waivers and Deviations - Identification of each waiver/deviation applicable to the end item and/or installed components.

4. Shortages/Open Work - Identification of each hardware shortage/open work item existing at time of delivery, including but not limited to:

- a. Open discrepancy reports
- b. Open squawks
- c. Unincorporated engineering requirements (i.e. Engineering Orders, drawing changes, unaccomplished tests) as required by the as-designed configuration.

5. Material Review Actions - Identification of each Material Review Disposition applicable to the end item and/or its installed traceable components (i.e., those components requiring traceability by engineering documentation).

6. Removals and Replacements - Identification of each hardware removal/replacement from systems installation through-out subsystem test, integrated systems test and delivery.

7. As-Built Configuration - Identification of the as-built configuration of each end item including engineering change incorporation, to the traceable component level.

NOTE: Deltas between the as-designed and as-built configuration will be reported as open work in item 4 above.

(continued)

TABLE 7-XVIII - ELEMENTS OF ACCEPTANCE
DATA PACKAGE - CONCLUDED

8. Nonflight Hardware - Identification and location of nonflight and temporarily installed hardware items contained in each end item, including serialized streamers attached to all nonflight items not requiring physical removal to complete flight installations.

9. Test Results - Information identifying results of sub-systems, end items and integrated systems tests, including test variances.

10. GFE Log Books - Log Books received with each GFE items (i.e., Engine Log Books) will be updated as required for field site maintenance and transshipped with the hardware.

11. Field Site Transfer Book - Documenting shortages/open work at time of delivery and to provide a means of documenting initial inspection operations/results at the field location.

12. DD Form 250 - Documenting Government Acceptance.

13. Other Requirements - Additional data requirements that apply to a particular end item will be included in the AEF. These requirements will be identified by the SSPO or EFC.

TABLE 7 - XIX - ELEMENTS OF PRESSURE VESSEL HISTORICAL DATA

The documentation shall be provided for flight or flight-type pressure vessels and pressure vessels installed in associated ground support equipment that interfaces with flight hardware.

The following documentation shall be provided with the initial delivery of a given type of pressure vessel, but need not be submitted on a recurring basis for subsequent deliveries of identical pressure vessels unless changes are incorporated. The documentation shall indicate hardware effectivity.

1. Manufacturing Sequence of Operations
2. Manufacturing and Process Specifications
(Includes chemical processes, cleaning, welding, heat treatment, etc.)
3. Inspection Methods and/or Specifications
4. Fluid to Fluid and Fluid to Materials Compatibility
5. Design and Qualification Data

The following documentation will be included in all pressure vessel packages shipped to the customer for each delivered pressure vessel.

1. Material composition and mechanical properties.
2. Mechanical properties of forging and vessel.
3. Heat treatment of forging and vessel.
4. Fluid exposure and temperature during fabrication and testing.
5. Cleaning materials used, sequence of use, pressure if applicable.
6. Welding, weld joint preparation cover and backup gases and controls, repair procedures and controls, filler wire composition.
7. Inspection results.
8. Discrepancy and MR records.
9. Pressurization Data Log delineating actual chronological test and checkout history, including all proof, leak and cycling data along with the magnitude of pressure, type of pressurant and number of pressure cycles to which the vessel was subjected.
10. Pressure vessel statement indicating acceptability for flight use (GSE pressure vessels are excluded from this requirement).
11. GSE Exclusion. All GSE pressure vessels which have been designed, fabricated, and tested to the requirements of the ASME code for Unfired Pressure Vessels. Section VIII, 1971 Edition are excluded from the

(continued)

TABLE 7 - XIX - ELEMENTS OF PRESSURE VESSEL HISTORICAL DATA

(CONCLUDED)

above requirement, but documentation reflecting identification, use, pressure ranges, location and certification of compliance to design, fabrication, and testing in accordance with the ASME Code, for Unfired Pressure Vessels, Section VIII, 1971 Edition, shall be provided.

DISTRIBUTION REQUIREMENTS

The Space Shuttle Program Office (SSPC) requires certain information in order to perform its system integration function and to support its interface with NASA Headquarters. This information will be provided from two primary sources - Space Shuttle Project Offices and the Space Shuttle System Contractor. Additionally, there is a requirement for selected information produced by program elements to be made available for use by other program elements. These requirements must be recognized and treated individually to assure that the proper communication of necessary information is accomplished.

8.1 SPACE SHUTTLE PROJECT OFFICES

Some of the information provided to the project offices by their contractors will also be made available to the Program Office and other program elements simultaneously. This type of information may include such items as approved plans, schedules, configuration data, and progress/status reports. Other information should be consolidated at the project level and provided to the Program Office accompanied by the project manager's analysis. This type of information may include such items as contract activity/status, cost/obligation, action item reports, impact analysis, etc. Each project office shall provide appropriate instructions to its respective contractors regarding the foregoing procedures.

8.2 SPACE SHUTTLE SYSTEM INTEGRATION AND CREITER VEHICLE DEVELOPMENT CONTRACTOR

In its role as the Space Shuttle System Contractor, Rockwell International, Space Division, is responsible for developing, acquiring, analyzing, and reporting system-level information to the Program Office. This includes such items as the program schedule, total system mass properties, integrated test program requirements/activities, program requirements/status, etc. In order for the System

Contractor to accomplish this function, it will be necessary for him to have access to certain types of information from other program elements. Each project office shall assure that the proper arrangements are made with its contractors/performing activities to enable the System Contractor to acquire that information required to meet his reportorial obligations in a timely manner. Other Space Shuttle-related information generated as a result of NASA in-house or contracted effort, exclusive of sensitive data, shall be provided to the System Contractor as it is developed and as it has application to system or integration aspects of the program. Figure 8-1 represents a summary description of the communications flow required for the Space Shuttle Program. The official communications flow that takes place between the Program Office and the Project Offices is established by this Level II Program Definition and Requirements document. The official communications flow that takes place between the project offices and their respective contractors is established by contract provisions. However, various types of informal communications and coordination are required to ensure the most efficient operation of the many elements of this program. Each project office shall assure that this requirement is recognized and implemented as appropriate to ensure that adequate contractor-to-NASA and contractor-to-contractor communications are permitted and encouraged. All program interface with Shuttle users, or the payload community, will be accomplished and/or controlled by the Program Office.

8.3 DISTRIBUTION INSTRUCTIONS

The size, complexity, and interrelationships inherent to the Space Shuttle Program require that each program element have ready access to selected information developed by other program elements. Therefore, information developed by each program element shall be reviewed for possible use by other program elements as an integral part of its development process. The responsibility for this review begins with the information originator and ultimately rests with the Space Shuttle Program Office. Ideally, the requirement for information

distribution between program elements will be identified and accomplished by the originator who will notify the Program Office through the respective Project Office of action taken. The Program Office will maintain an overview of the information distribution activities between program elements and direct changes as necessary.

The general distribution requirements in Paragraph 8.4 herein are to be used by all program participants as guidelines in determining the interprogram element information distribution requirement, if any. Table 8-1 is provided to show the initial interprogram element distribution considered appropriate. This listing is considered to be the minimum communication requirements to be implemented by the respective project offices. The specific quantities of documents/information to be distributed between program elements should be negotiated by the affected program elements on an individual basis. The quantities should be based on each destination's minimum requirements to satisfy primary users plus file copies to handle subsequent requests. Where low usage is anticipated, the file copies at the supplying location should be relied upon rather than establishing additional file locations.

Each program element shall maintain an accurate accounting of documents prepared and distributed as well as dates, quantities, and destinations. These records shall be made available upon request for Program Office review. These reviews will be used by the Program Office to periodically assess the effectiveness of information communication among program elements.

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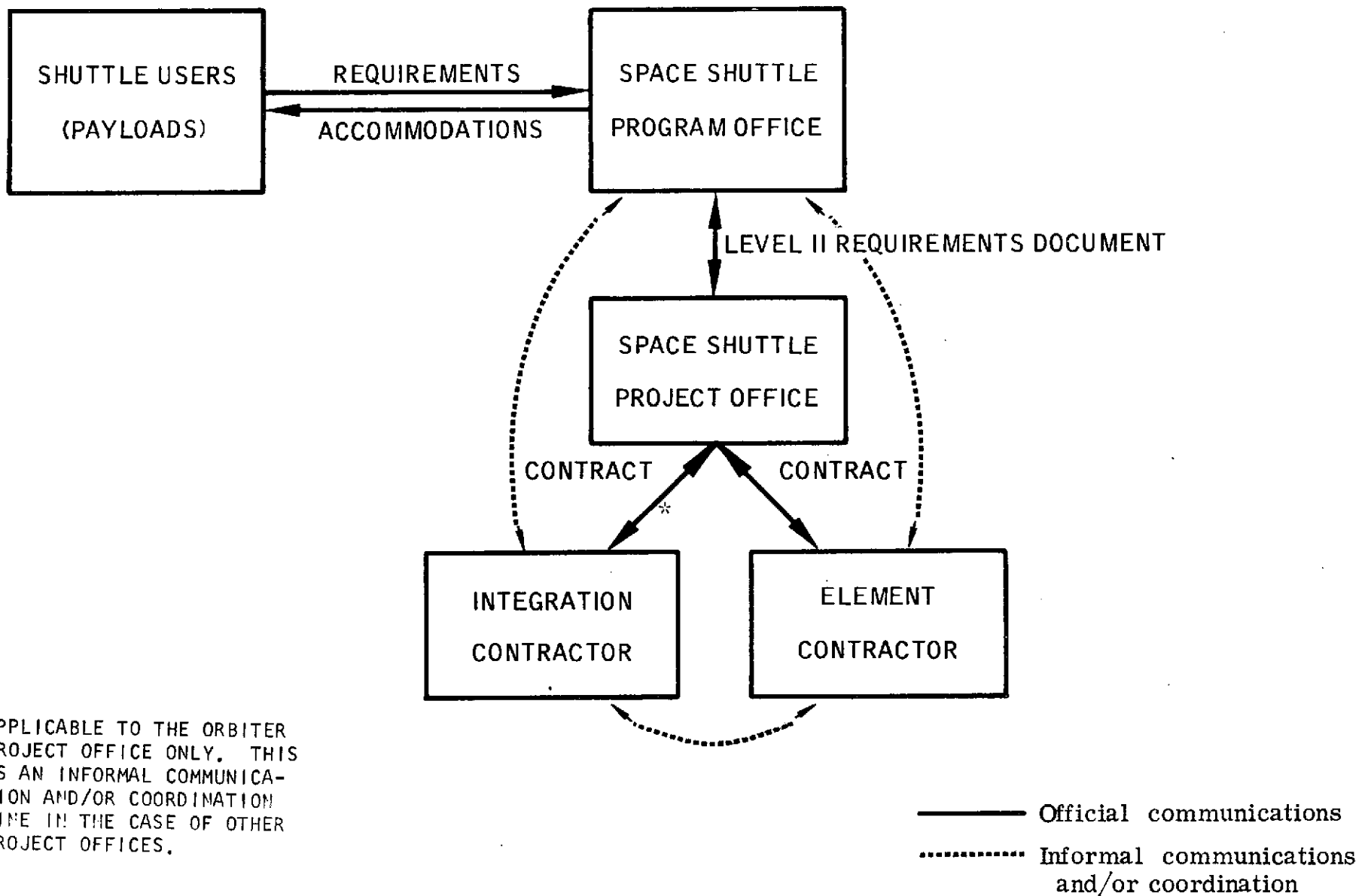


Figure 8-1.- Space Shuttle Program communications flow.

These guidelines and criteria are provided to assist each information-producing activity in determining the requirements for providing such information to other program elements. The basic assumption in making this determination must be that each program element can perform its function more efficiently when fully aware of the relationship and status of all other program elements. Additional considerations and more specific guidelines are provided herewith.

1. All significant Space Shuttle-related information produced by the NASA shall be provided to the JSC Space Shuttle Program documentation file, the System Contractor (Rockwell International), and to other Centers and contractors as deemed appropriate on the basis of content and intended use.
2. All program-level information produced by the Integration Contractor shall be provided to the SSFC, element project offices, and the prime element contractors. Prime contractors will be responsible for determining if further distribution to subcontractors is required. The exception to this guideline is Type 1 information (requiring approval), which will receive wide distribution only after such approval has been obtained.
3. All element contractor developed information that is required to support System Contractor system-level reports (designated RX in Tables 7-II to 7-IV) shall be provided provided to Rockwell International Corp., Space Division. This same criterion applies in cases in which integrated reports are prepared by other sources (e.g., SSFO and KSC).
4. When an information-producing activity has determined that a wider distribution is required on a particular information product, the potential recipients should be contacted to verify their need.
5. All information should be shipped in the appropriate quantities to designated recipients at each destination. Preshipment coordination is necessary so that the recipients can prepare for receipt and the necessary internal distribution.

6. Designated recipients for information shipments are shown herewith along with the designated information manager who is the point of contact for coordinating requirements and quantities.

NASA Headquarters (HQS)
MH-B/Howard Roseman (202-755-3188)

Johnson Space Center (JSC)
JMS6/Distribution Operations -
IV/M. J. Medack (713-483-6361)

Kennedy Space Center (KSC)
IS-LCC-M/Documentation Division -
SF-MEC/J. S. Ackerman (305-867-6308)

Marshall Space Flight Center (MSFC)
A&TS-M-D/Documentation Repository -
SF-FC/T. J. McCullough (205-453-2814)

Rockwell International Corp., Space Division (SD)
41-210-100, BA77/R. S. Coopman (213-922-2635)

Rocketdyne (EKD)
To be provided later

Space and Missile Systems Organization (SAMSC)
XRZ/E. Collins (213-643-0022)

8.5

LEVEL II BASELINE DOCUMENT DISTRIBUTION

The Program Manager's Level II Baseline is described in JSC-07700 (Table 7-II, item 4MA-1). This document consists of multiple volumes, the preparation, maintenance, and distribution of which will be managed by the Space Shuttle Program Office. Distribution lists will be controlled by the Management Systems Office (IV). This office will receive recommended distribution requirements from NASA elements, contractors/subcontractors, and governmental requestors and will develop the total distribution list. Distribution quantities will be held to a minimum to accommodate page change updates at a reasonable effort. Distribution of copies of all baselined volumes will be accomplished by the JSC Distribution Center. Within the JSC, distribution will be handled on an individualized basis (by mail code)

to each addressee. However, all other addressees, remote to JSC, will receive bulk shipments for internal distribution; each such addressee will be responsible for internal distribution and for any further distribution to contractors or subcontractors, as appropriate. All change packages updating baselined volumes will be routed from JSC Distribution Center to the same addressees as the basic volumes. Therefore, it will be necessary for each addressee to maintain an accurate accounting of document holders so that the change packages can be properly routed. Procedures will be established whereby contractor representatives, not included on normal distribution lists, may have access to JSC-C7700 volumes. When such requests result in the issuance of one or more volumes for reference purposes, those volumes will not be routinely maintained and will be so marked on the volume cover page.

TABLE 8-I.- DISTRIBUTION FOR INFORMATION REQUIREMENTS DOCUMENTATION - CONTINUED

Number	Title	Minimum Distribution								
		<u>JSC</u>	<u>KSC</u>	<u>MSFC</u>	<u>SD</u>	<u>RKD</u>	<u>MMC</u>	<u>SRB</u>	<u>HQS</u>	<u>SAMSO</u>
1CB-1	(Reserved)									
1CB-2	(Reserved)									
1CB-3	Level II Change Request	X	X	X	X					
1CB-4	Interface Control Document (ICD)	X	X	X	X				X	X
1CB-5	System Drawing Index	X	X	X	X	X	X	X		
1CB-6	Electromagnetic Compatibility Management Plan	X	X	X	X	X	X	X		
1EN-1	Master Measurements List	X	X	X	X	X	X	X		
1LG-1	Orbiter Integrated Ground Operations Plan (HFT)	X	X	X	X	X	X	X	X	X
1LG-2	System Integrated Ground Operations Plan (VFT)	X	X	X	X	X	X	X	X	X
1LG-3	(Reserved)									
1LG-4	Integrated Logistics Schedule	X	X	X	X	X	X	X		
1MA-1	Space Shuttle Level II Program Definition and Requirement (JSC 07700)	X	X	X	X				X	X
1MA-2	(Reserved)									
1MA-3	(Reserved)									
1MA-4	(Reserved)									

TABLE 8-I.- DISTRIBUTION FOR INFORMATION REQUIREMENTS DOCUMENTATION - CONTINUED

Number	Title	Minimum Distribution								
		JSC	KSC	MSFC	SD	RKD	MMC	SRB	HQS	SAMSO
1MA-5	Program Operating Plan (POP)	(Requirement, scheduling, and distribution will be established by POP call letters) (Ref. Vol. XV)								
1MA-6	Element Contract Data	(Data and distribution requirements defined in Vol. VII, JSC-07700)								
1MA-7	Operational Documentation Requirements	To be published as attachment to JSC07700, Vol. XII.								
1MA-8	Management Plan, Matl. Control and Verification	X	X	X	X					
1MT-1	Master Verification Plan, Vols. I & II	X	X	X	X				X	X
1MT-2	Vertical Flight Test Requirements Document	X	X	X	X	X	X	X	X	X
1MT-3	(Reserved)									
1MT-4	Horizontal Flight Test Requirements Doc.	X	X	X	X	X	X	X	X	X
1SR-1	Qualification Test Requests	X	X	X	X					
1SR-2	Requests, Substitutions and Deviations, EEE Parts	X	X	X	X					
1TR-1	System Training Plan	X	X	X	X	X	X	X		
2CB-1	End Item Specification	X	X	X	X					
2CB-2	Drawings and Associated Lists	X	X	X	X					

TABLE 8-I.- DISTRIBUTION FOR INFORMATION REQUIREMENTS DOCUMENTATION - CONTINUED

Number	Title	Minimum Distribution								
		JSC	KSC	MSFC	SD	RKD	MMC	SRB	HQS	SAMSO
2CB-3	System Baseline Accountability Report	X	X	X	X	X	X	X		
2CB-4	Space Shuttle Integrated Program ICD Status List	X	X	X	X	X	X	X	X	X
2CB-5	(Reserved)									
2CB-6	Station Set Specification (Development Test Sites)	X	X	X	X					
2CB-7	KSC Station Set Requirements	X	X	X	X					
2EN-1	Mass Properties Status Reporting	X	X	X	X	X	X	X		
2EN-2	(Reserved)									
2EN-3	(Reserved)									
2EN-4	System Wind Tunnel Test Status Report	X								
2EN-5	Drawing Release Status Report	X								
2EN-6	Requirement/Definition Documents	X	X	X	X					
2EN-7	Space Shuttle Definition Handbook	X	X	X	X	X	X	X	X	X
2EN-8	(Reserved)									
2EN-9	Integrated Schematics	X	X	X	X					

Number	Title	Minimum Distribution							
		JSC	KSC	MSFC	SD	RKD	MMC	SRB	HQS
2EN-10	Software Development Plan	X							
2EN-11	Control Materials List of Material Permitted and around the Vehicle During Ground Operations	X	X	X	X				
2EN-12	Materials Properties Deviation/ Waiver Request	X			X				
2EN-13	Worksheets, Standard For Accountability, Control, Track- ing Information, and Data on Materials	X			X				
2EN-14	Simulation Plan	X							
2LG-1	Space Shuttle Operational Data Books	X	X	X	X				
2LG-2	System Turnaround Processing Flows	X	X	X	X	X	X	X	
2LG-3	Maintainability Status Report	X	X	X	X	X	X	X	
2LG-4	Logistics Support Plan	X	X	X	X				
2MA-1	Element Management Plan	X	X	X	X				
2MA-2	Expanded Work Breakdown Structure (WBS)	X	X	X	X				
2MA-3	Project Schedule	X	X	X	X				

TABLE 3-I.- DISTRIBUTION FOR INFORMATION REQUIREMENTS DOCUMENTATION - CONTINUED

Number	Title	Minimum Distribution								
		<u>JSC</u>	<u>KSC</u>	<u>MSFC</u>	<u>SD</u>	<u>RKD</u>	<u>MMC</u>	<u>SRE</u>	<u>HQS</u>	<u>SAMSO</u>
2MA-4	Management Information Center (MIC) Audiovisual Material	(Distribution I/A/W MIC operating agreements)								
2MA-5	Schedule, Technical, and Resources Report	X	X	X	X					
2MA-6	System Status Report	X	X	X	X	X	X	X	X	X
2MA-7	Monthly Project Budget Report	X								
2MA-8	NASA Form 533H Report	X	X	X						
2MA-9	NASA Form 533P Report	(Optional to 533H)								
2MA-10	NASA Form 533Q Report	X	X	X						
2MA-11	Cost per Flight Report	X	X	X	X	X	X	X	X	X
2MA-12	Information Requirement Document	X	X	X	X					
2MA-13	Information Accession List	X	X	X	X	X	X	X	X	X
2MA-14	Review Data (Handouts) From Significant Program/Project Reviews	X	X	X	X					
2MA-15	Technical Performance Assessment Report	X	X	X	X					
2MA-16	(Reserved)									
2MT-1	In-Process & Integrated	X	X	X	X					

BLE 8-I.- DISTRIBUTION FOR INFORMATION RE ELEMENTS DOCUMENTATION - CONTINUED

Number	Title	Minimum Distribution								
		JSC	KSC	MSFC	SD	RKD	IMC	SRB	HQS	SAMSO
	C/O Reqmts. Doc.									
2MT-2	Horizontal Acceptance Flight Reqmts. Doc.	X	X	X	X					
2MT-3	Preflt. C/O Reqmts. Doc	X	X	X	X					
2MT-4	Shuttle Certification Status Reports	X	X	X	X					
2MT-5	Master Verification Plan, Vols. III to IX	X	X	X	X	X	X	X	X	X
2MT-6	(Reserved)									
2MT-7	Element Certification Status Reports	X	X	X	X					
2MT-8	Report, Materials Test Results	X	X	X	X					
2MT-9	Materials Tests Requests	X	X	X	X					
2PA-1	Problem Report	X	X	X	X					
2PA-2	Open Problem List	X	X	X	X	X	X	X		
2PA-3	Problem Closeout and Explanations Report	X	X	X	X	X	X	X		
2PA-4	Failure/Unsatisfactory Condi tion Summary Report	X	X	X	X	X	X	X		
2SR-1	Safety Analysis Report	X	X	X	X					

TABLE 8-1.- DISTRIBUTION FOR INFORMATION REQUIREMENTS DOCUMENTATION - CONCLUDED

2SR-2	Accident Report	X	X	X	X			
2SR-3	NASA ALERT System Documenta- tion	X	X	X	X	X	X	X
2SR-4	Failure Mode Effect Analysis (FMEA)	X	X	X	X			
2SR-5	Vehicle and GSE Limited Life Items List	X	X	X	X			
2SR-6	Project Parts List	X	X	X	X	X	X	X
2SR-7	Limited Life Waiver	X	X	X	X			
2SR-8	Critical Items List	X	X	X	X			
2SR-9	EEE Part Qualification Test Reports	X	X	X	X			
2SR-10	EEE Parts Where Used Status Print-out	X	X	X	X			
2SR-11	(Reserved)							
2SR-12	Contamination Control Plan	X	X	X	X	X	X	X
2TR-1	System Training Requirements Analysis Document	X	X	X	X	X	X	X
2TR-2	System Programmed Instruc- tion Manuals	X	X	X	X	X	X	X

9.0 DOCUMENT CHANGE PROCEDURES

A desirable feature for the Space Shuttle Program would be common usage of document change procedures by all program participants. However, such a system may not be the most economical approach in all cases; therefore, firm requirements are not established. Instead, the change procedure used by the Space Shuttle Program Office (SSPO) in maintaining JSC-07700 is presented as a standard for use by program participants in developing their own document change procedures. These standard procedures provide a positive method of accounting for all changes.

9.1 APPLICATION

This change procedure will be used by the SSPO for maintaining JSC-07700 to reflect the Program Manager's Level II baseline, including all approved changes. Further, this change procedure is to be used as a standard by all program participants in developing change procedures suited to their unique requirements. Use of similar or compatible procedures by all program participants is highly desirable.

9.2 DEFINITION

The following definitions are provided for guidance.

9.2.1 Change

A change is an official correction to a document usually brought about by changed conditions or more complete information. Such a correction is not extensive enough to require retyping and reprinting of the entire document and usually consists of an instruction to replace a few pages with those of later issue. Documents of 10 pages or less are revised, not changed. Changes are numerically issued alterations to a document or any portion thereof.

9.2.2 Change Sheet

A change sheet is a device for formally transmitting changes in content or corrections to an existing document; a change sheet requires the full level of authority needed for issuance of the original document, as shown in figure 9-1.

9.2.3 List of Effective Pages

The list of effective pages is a device commonly used to ensure that a document contains all pages currently required for effective use. A sample list of effective pages is shown in figure 9-2.

9.2.4 Revision

A revision is a major change, extensive enough to require retyping, reprinting, and reissuance of the entire document. A revision is required (a) when the changed and corrected material equals 30 percent or more of the document's original pagination, including any previous changes, or (b) when a document of 10 pages or less is changed. Authorizations required for a revision are the same as those required for the original document. Revisions are indicated by capital letter suffixes.

9.2.5 Supplement

A supplement is a collection of data, printed or otherwise, providing more detailed information on the subject of the original document. The supplement may contain privileged or proprietary information. It may also contain detailed applications of procedures, such as computer programs, which are too voluminous (and thus too expensive to print in quantity) to be attached to the basic document for general distribution. The supplement may not be printed; instead it may exist in the form of film, as a set of instrument record tracings, or as a videotape recording. A printed supplement will normally appear as an appendix, separately supplied, or as an integrated portion of the basic document.

9.3 PROCEDURES FOR CHANGES OR REVISIONS

The following requirements shall govern changes and revisions. As stated, the requirements for a document change differ from those for a document revision. Detailed instructions and procedures concerning both are discussed in this subsection.

9.3.1 Procedures for Changes

The following instructions and procedures govern the issuance of changes to a document.

1. Change sheets are issued only on documents containing 11 or more pages.
2. A change sheet (fig. 9-1) shall be prepared for each change. All changed pages accompanying the change sheet shall be listed therein, with instructions to make corrections or to replace pages as required.
3. The change sheet shall bear the title, revision letter (if any), number, and effective date of the change. The "List of Effective Pages" shall bear the change number and the date as shown in figure 9-2, but the tabulation on that page shall include all applicable change numbers for the pages listed.
4. Change pages shall replace pages of the same numbers, if possible. Added pages that are to be inserted between previously printed pages shall contain the number of the left-hand (even-numbered) page suffixed with a capital letter for each added page (e.g., 2-34A, 2-34B, etc.).

NOTE: The letters "I" and "O" shall not be used, because of the obvious possibility of confusion with "one" and "zero."

If it is necessary to insert new pages between pages 2-34A and 2-34B, such pages shall be numbered beginning with 2-34A-1, 2-34A-2, and so on.

5. When pagination continuity is broken by deletion of a page, a properly numbered replacement page shall be furnished, blank except for a centrally located notation indicating "Page/Figure/Table - Deleted." If back-to-back pages or several sequential pages are deleted, the centrally located notation must explain the break in pagination (e.g., "Pages 3 to 8 deleted").

6. If so much supplementary material has to be added to a right-hand (odd-numbered) page that the subsequent (even-numbered) page is affected, the even-numbered page will be reissued containing as much material as possible; any resultant text overrun will be provided on a supplemental change page numbered X-XXA, as previously stipulated in item 4.
7. New, or significantly changed, material provided by a change page will be denoted by a vertical change bar in the outer margins of such material (fig. 9-3). This change bar (approximately 1mm or 1/32" wide) is to be used for text, figure, and table changes to draw the reader's attention to significant alterations. (Minor corrections to grammar or spelling need not be so notated; similarly, changes in figures (but not tables), in alphabetical reorderings, or in sizes of headings need not be so indicated).
8. Added numbered items, paragraphs, pages, figures, tables, or appendices provided by changes shall contain the next sequential number available, if possible. Where additional material has to be inserted between preexisting numbered material, the alphanumeric suffix system previously described (item 4) for pagination will apply - that is, alphabetic suffixes, supplemented by numeric suffixes.
9. In the rare instances not delineated herein, common sense should prevail regarding changes, additions, or deletions. The comprehensibility of the instructions regarding change making (generally performed by a clerk) is paramount only to the comprehensibility of the change to the reader.
10. When a change requires deletion of a figure or table without substitution of another, a centrally located indication of the deletions shall be inserted in the resultant blank area.

11. When a change page containing a photograph (halftone illustration) or a line drawing (artwork) is part of a change, the entire page (suitable for emplacement in the document) must be provided. "Windows" or blank areas for paste-down of previously existing figures are expressly prohibited.

9.3.2 Procedures for Revisions

The following instructions and procedures govern the issuance of revisions to a document.

1. Document containing 10 or less pages are revised, not changed.
2. Documents containing more than 11 pages shall be revised when a proposed change, in addition to all previous changes, affects more than 30 percent of the document pages.
3. Revisions shall be prepared in the same manner as basic documents except as required herein.

When revised editions are issued, all nonstandard pagination and alphanumerical additions will be deleted so that the hybrid nature of the document will be suppressed. All numbered items, paragraphs, pages, figures, tables, or appendices will be renumbered in order as though no previous document issue has ever existed, and all previously published change bars will be deleted.

NOTE: The only exceptions to this statement are that change bars are required in revisions for three purposes:

- (1) Changes involving critical items, such as flight safety, reliability, or quality.
- (2) Changes involving correction of significant errors that jeopardize personnel or valuable equipment.
- (3) Insertion of new and revised material will be indicated in revisions by change bars in the Contents, List of Figures, and List of Tables; however, only significant insertions (as indicated previously in items (1) and (2)) must also be annotated in the basic document.

CHANGE SHEET

FCF

LEVEL II PROGRAM DEFINITION AND REQUIREMENTS
Volume X - Space Shuttle Flight and Ground System Specification

CHANGE NO. 5

Program Requirements Control Board Directive No. SS00076
June 25, 1973

Secretary, Program Requirements
Control Board

CHANGE INSTRUCTIONS

1. Remove the following listed pages and replace with the same numbered attached pages:

Page	PRCED NO.
93	
94	SS00076
95	SS00076
96	SS00076
97	SS00076
98	SS00076

2. Insert the following new pages:

95a	SS00076
95b	SS00076
98a	SS00076
98b	SS00076

Note: A black bar in the margin indicates the information that was added or changed.

3. Remove List of Effective Pages and replace with attached List of Effective Pages, dated June 25, 1973.
4. Sign and date this page in the space provided below to show that the changes have been incorporated and file immediately behind "List of Effective Pages".

Signature of person incorporating changes

Date

Figure 9-1 Change sheet (example).

LEVEL II PROGRAM DEFINITION AND REQUIREMENTS
Volume X - Space Shuttle Flight and Ground System Specification

Baseline Issue (Reference PRCEL No. SS00027, March 20, 1973)

LIST OF EFFECTIVE PAGES
June 25, 1973

The current status of all pages in this document is as shown below:

Page No.	Change No.	PRCEL No.	Date
i-vi	Original	SS00027	March 20, 1973
1-9	Original	SS00027	March 20, 1973
10	2	SS00035	April 27, 1973
11	Original	SS00027	March 20, 1973
12	4	SS00037	June 4, 1973
13-33	Original	SS00027	March 20, 1973
34-35	2	SS00039	April 27, 1973
36-39	Original	SS00027	March 20, 1973
40	2	SS00034	April 27, 1973
41	2	SS00019A	April 27, 1973
42-61	Original	SS00027	March 20, 1973
62	2	SS00039	April 27, 1973
63-65	Original	SS00027	March 20, 1973
66	2	SS00041	April 27, 1973
67	Original	SS00027	March 20, 1973
68	2	SS00034	April 27, 1973
69-93	Original	SS00027	March 20, 1973
94	2	SS00040	April 27, 1973
94	3	SS00045	April 27, 1973
94-98b	5	SS00076	June 25, 1973
99-157	Original	SS00027	March 20, 1973
158	1	SS00028	April 13, 1973
159-170	Original	SS00027	March 20, 1973
171-172	4	SS00037	June 4, 1973
173-192	Original	SS00027	March 20, 1973
10.10-1 through 10.10-21	Original	SS00027	March 20, 1973
10.11-1 through 10.11-6	Original	SS00027	March 20, 1973

CHANGE NO. 5

Figure 9-2 List of Effective Pages (example).

3.3.2 Solid Rocket Booster (SRB) Characteristics.

3.3.2.1 SRB Performance Characteristics.

3.3.2.1.1 SRB Ascent The SRB's when operating in a normal mode in parallel with the orbiter vehicle ME's, shall provide impulse and thrust vector control to thrust the flight vehicle from liftoff to SRB staging.

SOURCE:

3.3.2.1.2 Thrust Termination. Deleted

SOURCE:

3.3.2.1.2.1 Net Thrust Residual. Deleted

SOURCE:

3.3.2.1.3 Solid Rocket Booster (SRB) Performance Requirements.
The following parameters shall define the performance of the SRB (see 6.1.9) at a reference temperature of 70°F. The nominal specific impulse shall be used for shuttle system sizing.

- | | |
|---|----------------------------|
| a. Total impulse (nominal, vacuum) | 267.7 mlb-sec $\pm 0.67\%$ |
| b. Specific impulse (nominal, vacuum) | 266.7 sec \pm (TED) |
| c. Thrust-time relationship | Figure 3.3.2.1.3a |
| d. Thrust vector alignment accuracy
(during web burn time) | Figure 3.3.2.1.3b |
| e. Thrust tail-off | Figure 3.3.2.1.3c |
| f. Maximum ignition transient between
two SRB's | 300,000 lbs |
| g. Maximum steady state thrust transient
between the two SRB's | 200,000 lbs |

SOURCE:

3.3.2.1.4 SRB Operating Temperature Limits. Deleted

Figure 9-3a - Text and Table changes (example).

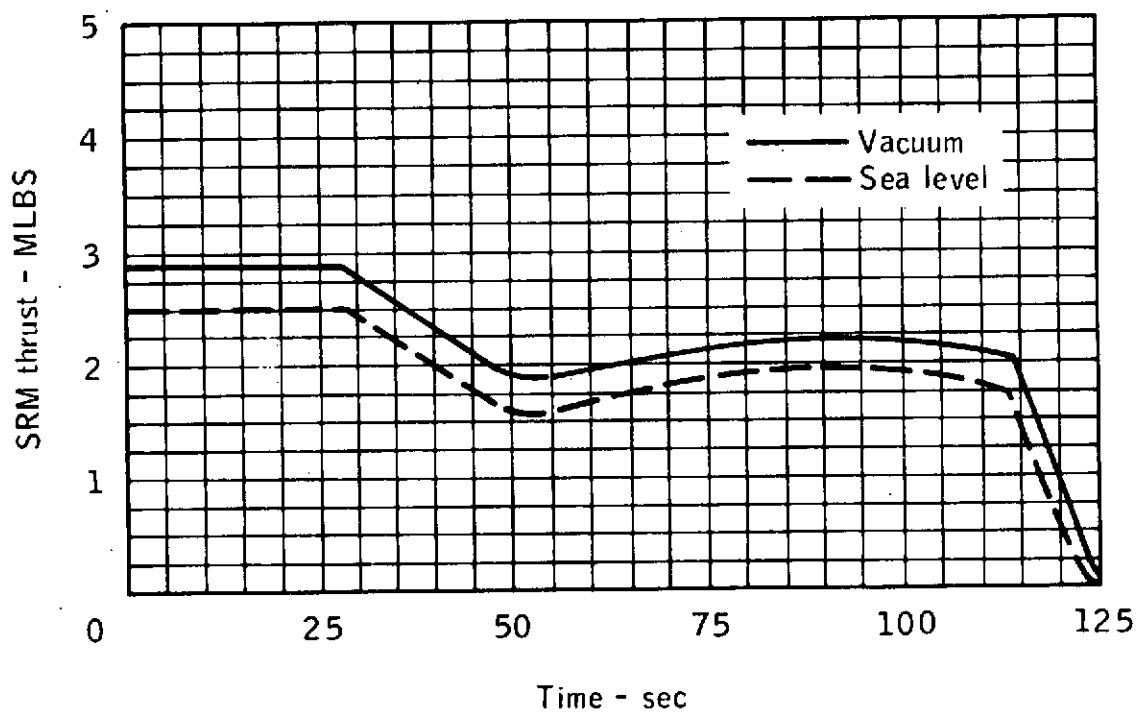


Figure 3.3.2.1.3 a SRM (see 6.1.8) thrust time profile.

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- The line of action shall be within 0.5 inches of the nozzle/SRM centerline
- The line of action of the thrust vector, during web burning, shall be within 1.0 deg (half angle) of a line coincident with or parallel to the SRM/ nozzle centerline

Figure 9-3c
9-10

95a

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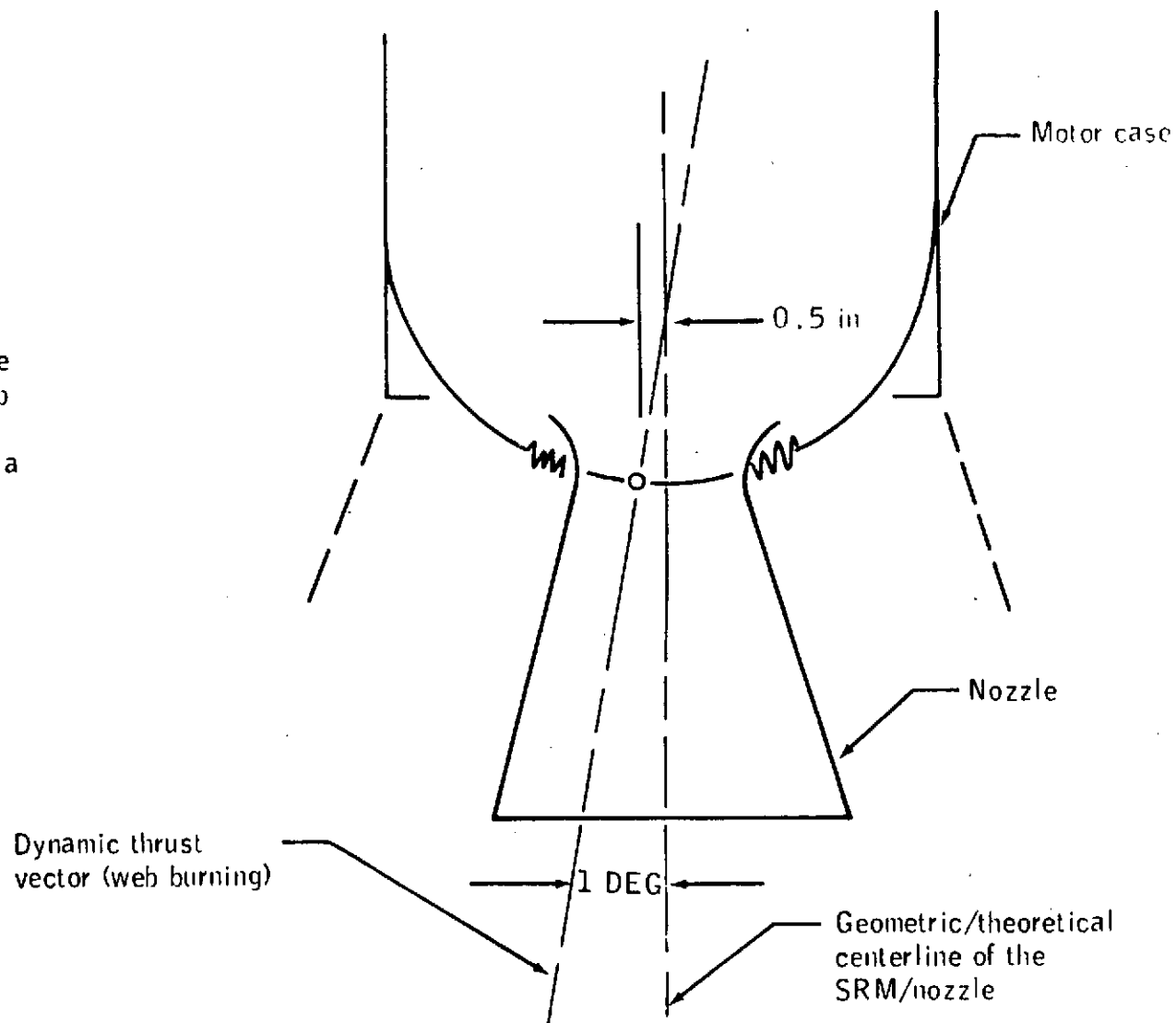


Figure 3.3.2.1.3_b SRB system thrust vector alignment.

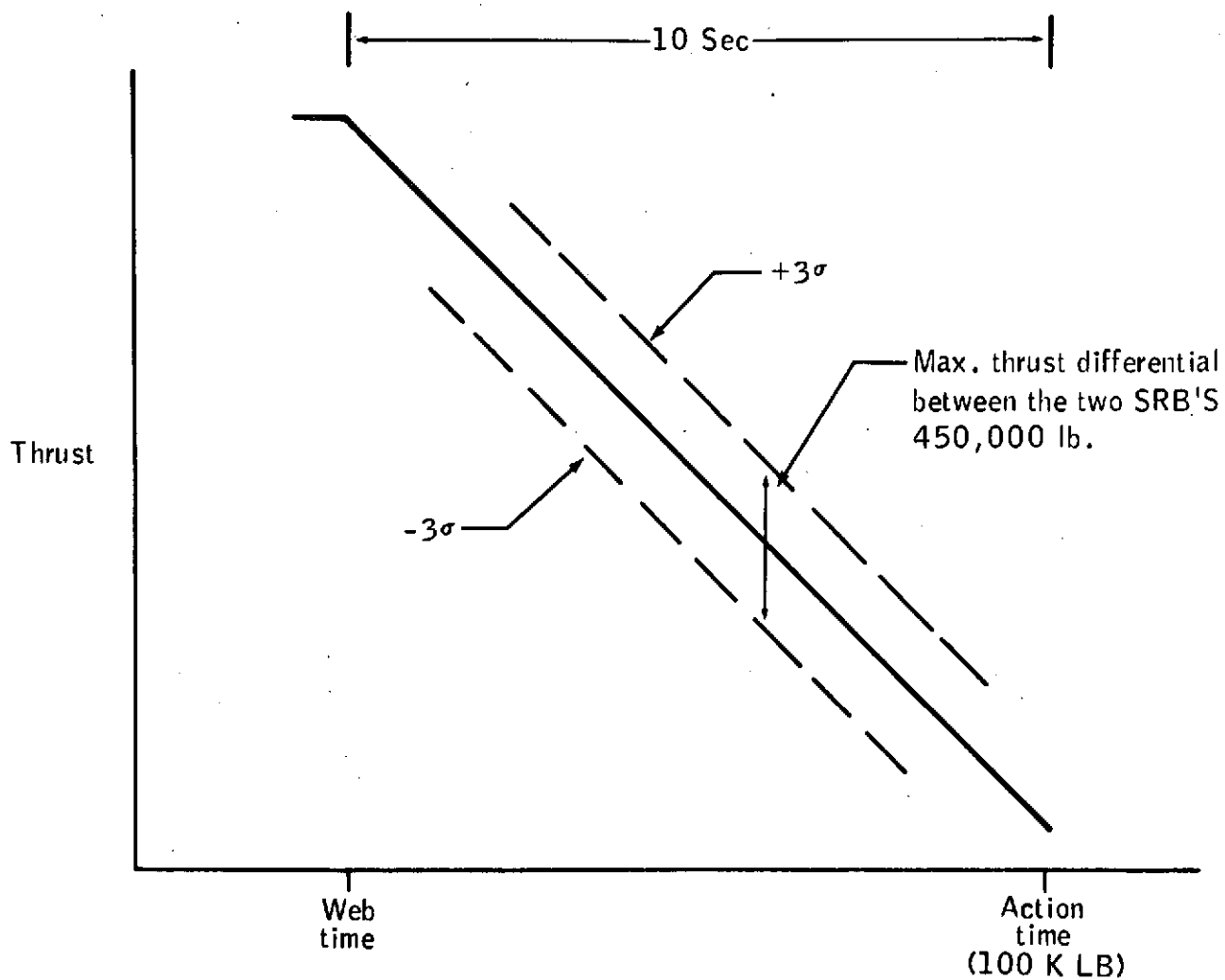


Figure 3.3.2.1.3.c SRB thrust tail-off.

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95b

Figure 9-3d

9-11

3.3.2.1.5 Center of Gravity. The SRB center of gravity shall be as specified below:

<u>CONDITION</u>	<u>LONGITUDINAL (X)</u>	<u>VERTICAL (Z)</u>
Inert	1749.6 in ± (TBD)	400.0 in ± (TBD)
Loaded	1697.0 in ± (TBD)	400.0 in ± (TBD)

Reference: X - FT Nose = See Figure 3.6.11
Z - FT Centerline = See Figure 3.6.11

SOURCE:

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Figure 9-3e

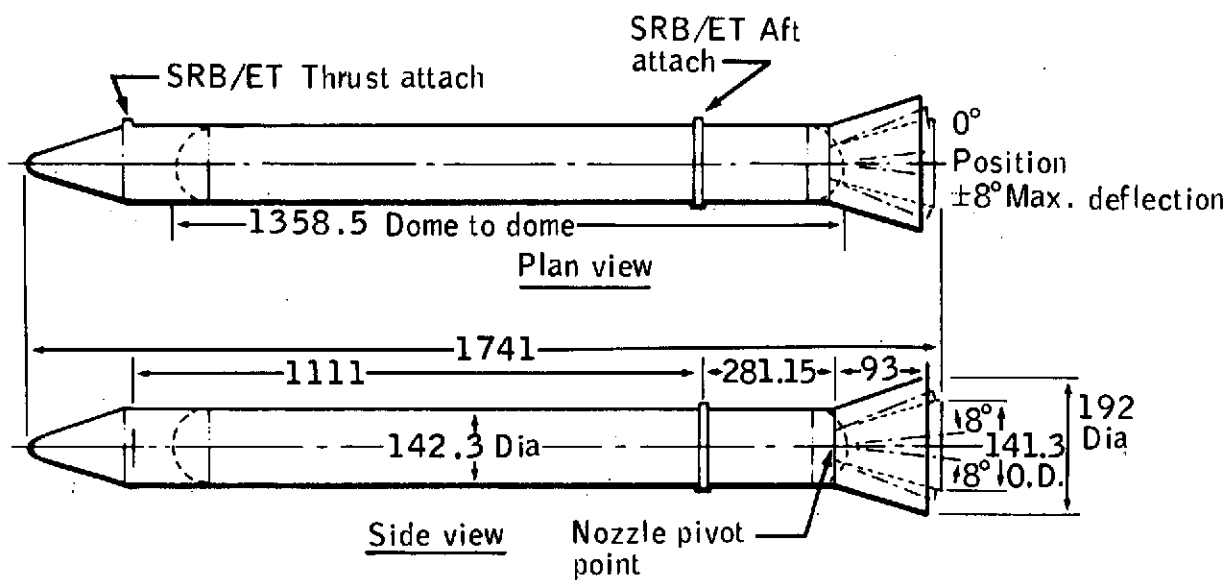


Figure 3.3.2.2.1 SRB Moldline envelope

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3.3.2.2 SRB Design Characteristics.

3.3.2.2.1 External Configuration. The SRB shall conform to the moldline envelope shown in Figure 3.3.2.2.1.

SOURCE:

3.3.2.2.1.1 SRB Water Recovery. The SRB shall be designed for water recovery, refurbishment, and subsequent reuse.

SOURCE:

3.3.2.2.1.2 SRB Control Weight. The SRB control weight (inert) including attachments, recovery provisions, and margins shall not exceed 154.252 lbs.

SOURCE:

3.3.2.2.1.3 SRB Propellant Weight. The SRB propellant weight (usable propellant load) shall be 1,009,289 lbs \pm 0.3%.

SOURCE:

3.3.2.2.1.4 Thrust Vector Control (TVC). The SRB TVC shall have the capabilities shown in Figure 3.3.2.2.1.4. The SRB TVC system shall be designed to fail to the null position (0° pitch, 0° yaw).

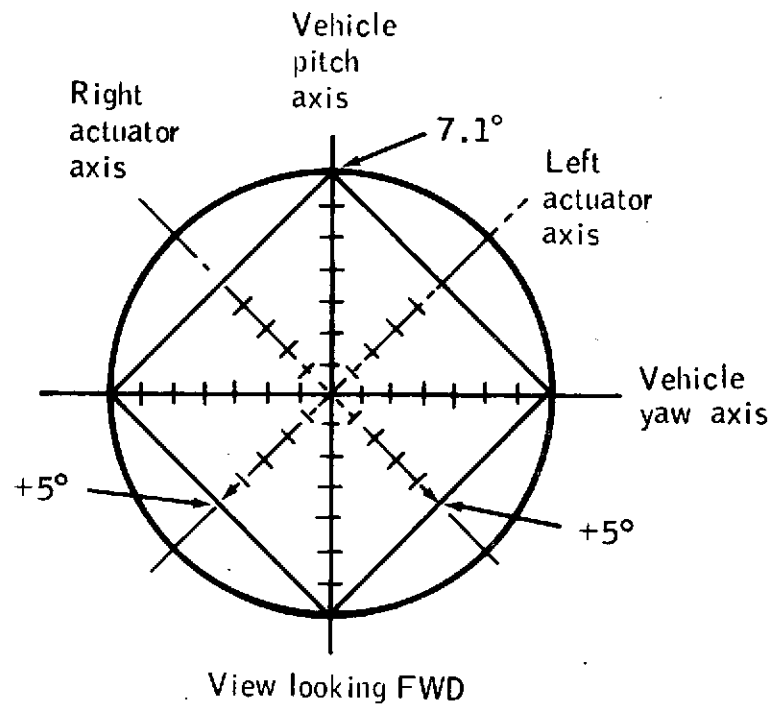
SOURCE:

3.3.2.2.2 Pyrotechnics. The SRB pyrotechnics shall be selected and/or designed in accordance with 3.6.3.3 and subparagraphs.

SOURCE:

3.3.2.2.3 SRB Ignition System. The SRB ignition system shall have a safe/arm capability.

SOURCE:



7.1° Control
 0.5° Geometrical misalignment
 0.4° Overtravel

 8.0° Total

Note: Total duty cycle
 - Primary: 120°
 - Secondary: 120°

Figure 3.3.2.2.1.4. SRM nozzle deflection requirements.

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98a

Figure 9-3h

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NASA-JSC

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSPC FOR APPROVAL - CONTINUED

<u>Number</u>	<u>Title</u>	<u>Source</u>	<u>OPR</u>	<u>Description/Comments</u>	<u>Reference</u>
				segments back to the casting plant. Within this document shall be contained processing flow plans to better relate the various functions in terms of time, constraints, and potential parallelism. This plan shall also include definition of the routine maintenance and checkout operations required prior to each flight.	
1LG-3	(Reserved)				
1LG-4	Integrated Logistics Schedules	S	LG	The Space Shuttle Program Office will develop and maintain the program logistics schedule using inputs from Shuttle project managers.	Vol. XII, para 10.2
<u>Management (MA)</u>					
1MA-1	Space Shuttle Level II Program Definition and Requirements (JSC-07700)	S	LV	This document contains program definition information and contains the Program Manager's level II baseline requirements. All elements of the Program Manager's level II baseline will be included in, attached to, or referenced from this document (JSC-07700). The requirements stated are applicable to all NASA Space Shuttle Program participants and certain of them are to be passed on to contractors/subcontractors. The document contents will be controlled by the Program Manager. For purposes of improved management and utilization, the document will be produced in 18 volumes.	Table 7-V Vol. I, para 3.0
1MA-2	(Reserved)				
1MA-3	(Reserved)				
1MA-4	(Reserved)				
1MA-5	Program Operating Plan (ECP)	SX,J,M,K	LR	Plan preparation instructions shall be provided via "calls" issued by the Program Manager, normally on 6-month intervals to support budget plans.	Vol. XV, para (TBD)
1MA-6	Element Contract Data	J,M,K	LV	These data shall provide the Program Office visibility into Element Contract development to assure that the Program-level requirements are properly included. This information shall be provided prior to RFE, prior to negotiations, and after ATF.	Vol. VII, para (TBD)

TABLE 7-II.- DOCUMENTS SUBMITTED TO SSEC FOR APPROVAL - CONTINUED

Number	Title	Source	OPR	Description/Comments	Reference
				<p>EMC required of the overall system</p> <p>b. Identification of objectives to be imposed on subcontractors</p> <p>c. Guidelines for analysis of test data</p> <p>d. Methods established for corrective action necessary to the integrated system</p> <p>The initial submittal is due 10 work days prior to SBR; updates are due 10 work days prior to System PDR; subsequent updates as required.</p>	
<u>Engineering (EN)</u>					
1EN-1	Master Measurements List	RX,J,M	1F	<p>The list shall include all flight element measurements displayed or telemetered. Preliminary due 10 work days prior to system PDR; updated 10 work days prior to System CDR; subsequent updates as required. The GSE measurement list is described in data requirement 3FW-2.</p>	Vol. X
<u>Operations/Logistics (LG)</u>					
1LG-1	Orbiter Integrated Ground Operations Plan (HFT)	KX	LG	<p>The plan identifies the details at an outline level of the tasks, operations, tests, and checkout functions associated with preparation of the orbiter for flight and turnaround during the horizontal flight test program. Within this document shall be contained processing flow plans better to relate the various functions in terms of time, constraint, and potential parallelism. This plan shall also include definition of the routine maintenance and checkout operations required prior to each flight. A section shall be provided within this plan to define the equivalent data associated with acceptance flight test of vehicles other than those assigned to the horizontal flight test program.</p>	Vol. IX, para (IED) MVP, Vol. I, Table 4.2-1
1LG-2	System Integrated Ground Operations Plan (VFT)	KX/RX	IG	<p>This document shall identify the details at an outline level of the tasks, operations, tests, and checkout functions associated with the preparation of each Shuttle element for mating and associated with preparation of the Shuttle stack for flight. Also included are the booster SRE recovery operations and the necessary descriptions to enable procedural preparation covering shipment of the SRE</p>	Vol. IX, para (IED) MVP, Vol. I, Table 4.2-1

TABLE 7-1.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CCNTINUED

(b) Documents submitted to SSPO only upon request - concluded

Number ----- Title-----

Safety, Reliability, and Quality (SR)

2SR-1	Safety Analysis Report
2SR-2	Accident Report
2SR-3	NASA ALERT System Documentation
2SR-4	Failure Mode Effect Analysis (FMEA)
2SR-5	Vehicle and GSE Limited Life Item List
2SR-6	Project Parts List
2SR-7	Limited Life Waiver
2SR-8	Critical Items List
2SR-9	EEE Part Qualification Test Reports
2SR-10	EEE Parts Where Used Status Printcut
2SR-11	Requests, Substitutions and Deviations, EEE Parts
2SR-12	Contamination Control Program Plan

Training (TR)

2TR-1	System Training Requirements Analysis Document
2TR-2	System Programmed Instruction Manuals

TABLE 7-I.- INDEX OF LEVEL II INFORMATION REQUIREMENTS - CONTINUED

(c) Documents submitted to SSPO only upon request - continued

Number	Title
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Configuration Baseline (CB)

3CE-1	KSC Station Set Specification
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Engineering (EN)

3EN-1	(Reserved)
3EN-2	GSE Measurements List
3EN-3	Analyses/Evaluation/Studies

Management (MA)

3MA-1	Photography
3MA-2	Documentation Tree
3MA-3	GFE Element Procurement Package Data

Manufacturing/Test (MT)

3MT-1	Facility Activation/Deactivation Plans
3MT-2	Test Reports
3MT-3	Certification Requirements
3MT-4	Qualification Site Approval
3MT-5	Certification Test Request
3MT-6	Test Agency Report
3MT-7	Test Start Approval
3MT-8	Quick Look Report
3MT-9	Engineering Analysis Report
3MT-10	Certification Approval Request
3MT-11	Certified Hardware List
3MT-12	Subsystem Certification Plans

Safety, Reliability, and Quality (SR)

3SR-1	EEE Parts Specifications
3SR-2	Nonconformance Reporting
3SR-3	Workmanship Standards
3SR-4	Acceptance Data Package
3SR-5	EEE Part Application Analysis Report
3SR-6	(Reserved)
3SR-7	Limited Life Status Reports
3SR-8	Pressure Vessel Historical Data